IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

LASERDYNAMICS	*	Civil Docket No.
	*	2:06-CV-348
VS.	*	Marshall, Texas
	*	
	*	July 1, 2009
QUANTA, ET AL	*	8:30 A.M.

TRANSCRIPT OF TRIAL PROCEEDINGS
BEFORE THE HONORABLE T. JOHN WARD
UNITED STATES DISTRICT JUDGE
AND A JURY

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P R O C E E D I N G S

COURT SECURITY OFFICER: All rise.

THE COURT: All right. Please be seated.

Good morning, Ladies and Gentlemen.

Good morning, Counsel.

Thank you, Members of the Jury, for being here timely.

Who will be your first witness,

Mr. Sankey?

MR. SANKEY: Your Honor, LaserDynamics will call Dr. Dennis Howe. He will be questioned by Mr. Tim Trop.

COURTROOM DEPUTY: Raise your right hand, please.

(Witness sworn.)

DENNIS HOWE, Ph.D., PLAINTIFF'S WITNESS, SWORN

DIRECT EXAMINATION

BY MR. TROP:

Q. Good morning, Dr. Howe.

A. Good morning, Mr. Trop.

Q. Would you please give the jury your educational background.

A. I've got a Bachelor's in physics from Cornell University, a Master's in science in optical engineering from the University of Rochester, and a Ph.D. in optics also from the University of Rochester.

Q. Where are you currently employed?

A. At the University of Arizona in Tucson.

Q. In what position?

A. I'm a research professor.

Q. How long have you been at the University of Arizona?

A. Since 1992.

Q. What did you do before you were a research professor at the University of Arizona?
A. I worked for the Eastman Kodak Company in Rochester, New York, for 27 years.
Q. And what did you do at Eastman Kodak Company?
A. I worked in Research & Development.
Q. Go ahead. Sorry.
A. I worked in Research & Development.
Q. And what products did you work in Research & Development?
A. I spent most of my career working in optical data storage products.
Q. And what are optical data storage products?
A. Optical data storage products are products which you can use beams of light to write and read information.
Q. What positions did you hold at Eastman Kodak Corporation?
A. I started out as a research associate -- research scientist in the research laboratories.
Actually -- I'm sorry -- I started out as a research development engineer in the Government Systems Division, and then moved over to the research laboratories as a scientist, and finally wound up being a lab head, an assistant technical advisor at the

divisional level.

Q. And what lab were you the head of at Eastman Kodak?

A. It was called the Systems Technology Laboratory.

Q. And what did that laboratory do?

A. We were working on -- we had groups working on three different technologies. One group was working on optical storage; a second group was working on electronic printing systems; and the third group was washing on gallium arsenide and laser diodes.

Q. Now, was -- was this group working on designs for future products or commercial products?

A. We were working in two areas. The first was basic research for future products, and also we did applied research to assist some of the product divisions in products that they were designing.

Q. Did Eastman Kodak actually sell optical disk drives?

A. I think Kodak got in the optical disk drive business in about 1984.

Q. Okay. And did the laboratory that you were the head of have any involvement in designing optical disk drives?

A. Yes.

Q. Now, have you actually designed components of optical disk drives yourself?

A. I have.

Q. And can you give some examples of that?

A. I've designed optical disks themselves, the configuration of optical disks. And I've also been involved in designing portions of optical heads. And I've designed modulation and error-correction systems for recording information on disks.

Q. And do you know how many patents you have in the design of optical disks and drives?

A. I believe there's 19 patents in that particular area.

Q. Now, taking over your whole career, how many years of design experience do you have?

A. From about 1965 till now. That's 40 years, roughly.

Q. And how many published technical papers do you have?

A. Over 30, I believe.

Q. Now, currently at the University of Arizona, do you have any research facilities there related to optical disk drive design or research?

A. I do.

Q. And what -- what facilities do you have?

A. I have a laboratory with several mastering machines in it and several hundred thousand, perhaps maybe a million dollars' worth of equipment which we use to work on optical storage systems.

Q. And did you use any of that equipment in connection with your analyses in this case?

A. I did.

MR. TROP: Now, Wendy, could you put up Plaintiff's Exhibit 2?

Q. (By Mr. Trop) Do you recognize this as the patent that's in-suit here today?

A. I do.

Q. And can you indicate when this patent application was filed?

A. It was filed in September of 1995.

Q. In September 1995, what were you doing?

A. I was working at the University of Arizona. As I said, I started there in 1992.

Q. Okay. And what -- what work did you do, if any, relating to the optical disk drives in 1980?

A. At that time, I was a member of an entity at Arizona called the Optical Data Storage Center, which was a center which was sponsored by amalgam -- a number of large industrial companies who had interest in optical data storage.

And they would -- they funded us to do particular research and development projects which they could jointly share.

Q. Okay. Could you give examples of companies who you were working with at that time?

A. Well, my former employer, Kodak, was one of them; IBM was there, Hewlett-Packard, Panasonic, Sony, 3M, companies like that.

Q. So when you worked with these companies, what was the nature of the work that you were actually doing for them?

A. I was working on developing equipment for evaluating the source of errors which could be -- which are found on optical disks so that the manufacturers of disks could better -- could make better disks, could improve their manufacturing processes. I also worked on systems for modulation and error correction, et cetera.

Q. And did you have an opportunity to meet with individuals from these various companies with whom you were doing research projects?

A. We would have project review sessions twice a year, which were attended by various representatives -- representatives from the sponsoring companies.

Q. And who would these representatives be?

A. Usually, there would be one research manager

or a fairly high-level person in the company who was basically writing the checks to sponsor us. And then coming along with him would be several of the engineers who were interested in the particular work we were doing.

Q. And where would this process happen? Was this at your facility, or would you go around the world to visit these different companies?

A. Well, the -- these particular project review sessions to which -- that we're talking about happened at the University.

Q. Doctor, what I would like to do now is move to the technical background.

MR. TROP: And with the Court's permission, I would like to approach the witness to hand them two optical disks.

THE COURT: Sure.

Q. (By Mr. Trop) Dr. Howe, could you explain what an optical disk is?

A. An optical disk is a small, 120-millimeter diameter, roughly 4 inches' diameter, piece of plastic which contains data, which is representative -- representative -- represented on the disk by optically readable marks.

Q. And I'd like to hand you Plaintiff's Exhibits

197 and 199.

What are Plaintiff's 197 and 199?

A. These are optical disk drives.

Q. So could you explain what an optical disk drive is?

A. An optical disk drive is the equipment or the apparatus in which an optical disk is inserted in order to have data read from it or data written to it.

Q. Now, if you hold those up and let the Court --

A. The disk or the drives?

Q. The drives. Thank you.

Those don't look like what I normally see in my computer. Why is that?

A. These are slim-line drives, and I believe these are mostly found in notebook computers. And so they're really hidden inside the computer, and the only thing that comes out that's visible to the user is the tray which accepts the disk.

MR. TROP: Do we have a laptop computer that we can --

Q. (By Mr. Trop) If I could just hand you a laptop computer and if you could show where the optical disk drives you have would go into a computer like this.

A. All right. I'll try.

The drive is right over here on the right-hand side (indicates).

Q. I guess I couldn't see that.

So I don't see the drive, though. Why is that?

A. Well, the drive is completely contained within the computer itself.

Q. And what is the silver thing that's shining, at -- hopefully, the jury can see it as well.

A. Well, it's a bezel, which advertises the various types of disks that the drive will play.

Q. And so if I'm going to put the drive in the computer, what do I do?

A. You press this button. The tray should come out. I think the drive -- the computer has to be powered up for that.

Q. No. I'm talking about if I have a computer with no drive in it, what do I do to put the drive -- how do I make the drive work with the computer?

A. I'm sorry. I didn't quite understand the question.

Q. Suppose I have a computer that doesn't have a drive in it.

A. Yes.

Q. And it's got a drive slot, what do I do?

A. Well, you insert drive in the drive slot.

Q. Okay. What happens when you put the drive in the drive slot?

A. The drives are designed with a connector on the back of them, and that connector is compatible with the connector on the computer. And there are various contacts or pins on that connector over which certain data and power will flow, and so the drive is designed to be compatible with the connector in the computer.

Q. Okay. Once the drive is put into the computer, then it is physically mounted in the computer?

A. That's correct as well, yes.

Q. And is it then electrically connected to work with the computer as well?

A. If the drive is compatible with the computer, yes, that's correct.

MR. TROP: Wendy, could you put up Demonstrative Exhibit 24, Slide 1?

Q. (By Mr. Trop) This is a picture. Could you explain what this slide shows?

A. That's a schematic diagram, which calls out various dimensions, mechanical dimensions of an optical disk.

In my right hand, I have a DVD disk. In my left hand, I have a CD disk. And they're both

mechanically identical.

For example, they both have 15-millimeter diameter center holes. They're outer diameter is 120 millimeters, and they're both about 1.2 millimeters thick.

Q. What happens when a user puts one of these disks in the drive in a computer?

A. The -- in these sorts of drives, a tray will come out, and the user deposits the disk in the tray and then either presses a button or pushes on the tray, and the tray will retract back into the drive.

And when that happens, the disk will be mounted on the -- on the spindle or turntable of the drive itself.

Q. Okay. And then what happens next, if anything?

A. Next, the drive will run through a procedure in which it identifies the type of disk that has -- that the user has inserted in it.

As I said, the DVD and CD disks are mechanically the same, and so the drive has to run some optical tests on the disk to determine whether a CD or a DVD has been inserted into it.

Q. And what does the drive do after that, if anything?

A. After it determines the type of disk that has been inserted, it configures itself so that it can read information from that type of disk.

Q. Okay. So what does the user have to do to get the drive to identify the type of disk and start playing the disk?

A. Put the disk in the drive -- or put the disk in the tray and press the button to close the tray, the door.

Q. So the user doesn't have to tell the computer or the drive what type of disk it is?

A. That's correct.

Q. Now, how do DVDs differ on -- how do DVDs and CDs differ in shape?

A. They don't mechanically.

Q. So can the drive use the shape of a DVD or CD to determine what type of disk is in the drive?

A. No.

Q. Okay.

MR. TROP: Wendy, could you put up Demonstrative Exhibit 24, Slide 2?

Q. (By Mr. Trop) Using Slide 2, could you explain how information is stored on an optical disk?

A. Well, information is stored on an optical disk in a stream or a trail of marks which are optically

readable. And those marks are arranged in a spiral which spirals -- in a spiral trail which starts at the inner radius of the disk and spirals out to the very outer radius of the disk.

Q. Could you indicate on the exhibit using a pointer, if possible, where the spiral trails are indicated?

A. Well, they're -- you can see these circular paths which are sort of in darker yellow there, and those indicate a single turn of that spiral trail. And by the way, the single turn, we refer to that as a track. And those tracks look very coarse there, and they're really not. There's about 50 tracks in the diameter of one human hair actually on a disk.

Q. Okay.

MR. TROP: So let's move to the next slide.

Q. (By Mr. Trop) Now, this slide says how -- how information is stored on an optical disk.

And what's the relationship between this slide and the prior -- and your prior slide?

A. Well, this -- this particular square area on the right of this slide is sort of a blowup of the square area. Actually, it's a blowup of a much smaller square area here on the left here.

And what it does is it shows -- let's see -- one, two, three, four, five, six, seven, eight (counting) -- ten portions of ten separate turns of spiral, or another way of saying it, is it shows portions of little segments of ten adjacent tracks on the disk.

And as you'll see, each track is comprised of these features which are called pits, and between the pits, another feature which is called a land. And information is represented on the disk by these pits and lands which lay along a track.

In fact, the information is represented by the length of the pit -- individual pits and the length of the individual lands.

Q. Can you give an indication of how wide these tracks are? I guess this -- do you have a -- can you give an indication or something that people could understand the relative size of these tracks?

A. Well, as I said, about 50 of those tracks will fit in the diameter of one human hair. For a CD, the separation between the center of one track and the -- and the center of an adjacent track is 1.6 microns. That's 1.6 millionths of a meter, very small. On a DVD, the separation is about half of that.

Q. Are you familiar with the term track pitch?

A. Yes, I am.

Q. What is track pitch?

A. Track pitch refers to the spacing between the center of adjacent tracks. So the track pitch and the CD would be 1.6 microns, and the track pitch in a DVD is .74 microns.

Q. Okay.

MR. TROP: Can we go to the next slide?

Q. (By Mr. Trop) Now, what is shown on the left in this slide?

A. On the left are sort of a magnetized -- a magnified cartoon of the pits and lands on this -- in the data surface of the CD disk.

And on the right is a similar cartoon of the pits and lands in the data surface of a DVD disk.

Q. And what -- can you explain what differences there may be between the pit configuration in the CD and the DVD?

A. Well, we already mentioned that the track pitch, the separation between adjacent tracks and a CD, was about twice as big as the separation and adjacent tracks in a DVD.

But in addition to that, the point these two little cartoons are trying to make is that the length of the pits and the width of the pits in a DVD are about

half the size of the pits and lands in a -- the width of the pits and lands in a CD.

Q. Now, does the different pitch of the tracks for a CD versus a DVD have any effect on how the drive reads these particular disks?

A. Yes, it does. Because the pitch of a CD is twice what the pitch of a DVD is, in order to follow the spiral trail as a disk is being played, the optical head, which is causing the beam of light to -- to be imaged -- be focused on the data -- on the pits on -- on the tracks of pits and lands, needs to move along the radial direction of the disk about twice as fast when it's playing a CD as it does when it's playing a DVD.

Q. And what is it that moves the head in an optical disk drive?

A. Well, there are two mechanisms. One is the lens -- the lens that focuses the light on the disk will move. But, in addition, the whole optical head itself rides on a sled which moves.

Q. And is there a system that causes that movement?

A. Yes. That system is called the tracking system.

Q. And could you explain at a high level what does the tracking system do?

A. Well, let me -- let me do that sort of by example. Let's say you have a CD mounted in your disk -- in your disk drive, in your CD disk player, and you're playing a particular song, and you decide you want to skip to a different song which is on a different portion of the disk.

When you press the button on the front of your drive saying go from Track 2, which you may be playing now to Track 6, the whole optical head will move along the radial direction of the disk. It will find Track 6 and settle on that and start playing that track by focusing -- focusing light on a completely different portion of the disk than it formerly had been.

MR. TROP: Wendy, could you put up Demonstrative Exhibit 24, Slide 5?

Q. (By Mr. Trop) Now, can you explain what this picture shows overall? What is this here?

A. This is a schematic or, if you will, a cartoon which depicts sort of the major components of a -- of an optical disk drive which are of interest in this case.

Q. Now, at the top, there's a thing in green. What -- what is that?

A. That's one-half of -- of a -- of an optical disk. What's been done there is the disk has been cut in half so you can see into the body of the plastic

substrate.

And you'll see within the plastic substrate is buried this -- the top half is in dark green, and the bottom half is sort of light green. And the thing that divides those two halves of the disk is -- is the data surface of the disk. And that's the -- the data surface is -- is the planer surface in the disk where the pits and lands reside.

And the little crenulations you see, the little sawtooth marks that you see there, they are meant to indicate different tracks on the disk. This is a very gross indication, because on a CD, from the inside radius to the outside radius, there's about 23,000 tracks. So here you can see only maybe 15 or 20.

Q. How many optical -- how many data layers can an optical disk have?

A. A CD has a single data layer, and a DVD can have two data layers.

Q. Now, in this picture, there is a thing indicated as a laser, and then a red kind of vertical line shooting out of that laser.

What is a laser?

A. A laser is a device which emits a beam of light which has special properties, and the special property of interest here is the fact that such a beam

of light can be focused by a lens into a very, very small point of light called the focus spot.

Q. So is this the laser right here (indicates)?

A. That's the laser right there, yes.

Q. What is this red coming off the top of it?

A. That red cone coming out of the laser and going up in the upward direction is meant to indicate a beam of light coming out of the laser. And that beam of light is intercepted by these two elliptical or oblong shapes. And those are meant to indicate lenses, and those lenses act together to focus the light on the data surface of the disk.

Q. Okay.

A. So on -- on the data surface of the disk, there would be a point of light which is -- has dimensions on the order of a few -- a few track widths.

Q. Now, the uppermost lens, do you see what I'm referring to as the uppermost lens?

Maybe I can --

A. Yes. That one right there (indicates).

Q. Okay. Above that, the laser beam appears to change shape; is that correct?

A. That's correct.

Q. Why is that?

A. That's the focusing action. So the beam which

is quite wide, here the beam might in a -- in a typical optical disk -- disk drive, the beam of light right here might be a few millimeters in width, and then the lens, the focusing action on the lens, concentrates it down.

So at the focal point of the beam of light might be just a few microns in width.

Q. Okay. And what -- to -- to those of us who don't know what microns are, what does that mean?

A. Well, there's a thousand microns in one millimeter. So if this beam is 5 millimeters wide, then the concentration is a factor of about, let's see, 7 or 800.

Q. Those of us who are still in English units, what does that mean?

A. A millimeter?

Q. Yes. In other words, people that don't use metrics.

A. A millimeter is 1/1000 of a meter. And a meter is roughly a yard.

Q. Okay. Thank you.

Can the drive move the position of the focus spot?

A. Yeah. You see, first of all, there's a two-headed arrow pointing in the -- in the vertical direction, and next to it, the words focus motor action.

That indicates that this lens, this top lens, is actually mounted in the little -- little motor, and that motor is able to move that lens up and down in the vertical direction.

Q. And so when the lens moves up, what happens to the focus spot?

A. The focus spot moves with it. The focus spot always appears at a fixed distance behind the lens, and that fixed distance is called the focal length of a lens.

Q. And so why do you want to move that focus spot around inside that disk?

A. Well, if you want to play a disk, the first thing you have to do is find the data surface. And by find the data surface, I mean you need to have a focal spot come and -- and -- and be incident on the data surface and then stay on that data surface as the disk spins.

Q. What is a focus scan or a focus search?

A. A focus scan and a focus search is an operation which is used to affect that process that I just talked about, namely, finding the data surface.

So on a focus scan, the lens would be moved down. It would be withdrawn far enough so that the focal -- the focus spot produced by that lens would fall

short, or be below this bottom surface of the disk. And that little lens would be moved up at a -- a fixed rate of speed such that the focus spot goes through that -- that bottom layer, through the plastic substrate itself, and finally finds and is trained onto the data surface.

Q. What happens to the laser beam when it impacts or shines on the data surface?

A. The laser beam is reflected highly from the data surface, because the data surface itself is a mirror-like surface which is buried inside the -- the plastic substrate of a disk.

There is some reflection from the outer transparent surface here, but that reflection is -- is -- is quite a bit less. And when I say quite a bit less, it's just a few percent compared to the reflection of the -- from the data surface.

Q. So what does this white downward arrow indicate?

A. Okay. That white downward arrow is meant to reflect -- is meant to represent light that's reflected from the disk and re -- reflected light that is reflected from the disk which reenters these lenses and is directed back downward into the optical head.

Q. So if you have light moving up towards the

disk and reflected light coming back, why don't you have a confusion or conflict?

A. There's this little component here shown in light blue; that's known as a beam splitter. And there are some other components in the head which are not shown, which don't need to be discussed here, and they cause -- they, together with the beam splitter, cause light, when it's going in the upward direction, to be transmitted through this beam splitter.

But when light is coming back down in the downward direction, it causes light to be reflected off to the right as shown.

Q. Now, what does -- what affects the reflection of the light from the data layer?

A. What affects the light? I'm sorry. I didn't --

Q. What affects the reflection?

A. Well, the -- the -- everything on the data layer. The data layer is not a mirrored surface. The data layer itself, as we said, is -- is -- contains many, many small pits of various sizes and tracks.

And so the focus spot of light is designed to overlap several tracks and several pits, not -- not just a single track. And so the -- the nature of the pits, as well as the depth of the pits into the data surface,

will affect the amount of light that is reflected back into the lens.

Q. So is the light reflected -- is the laser light reflected from those pits?

A. Yes, it is.

Q. Okay. And does some of that light that's reflected from the pits necessarily make it back to the rest of the optical system as indicated by that white line?

A. The amount of light which is reentered into the lens makes it back into the optical system and eventually finds its way onto this array of photodetectors, which are represented by this box labeled photo detection.

Q. In terms of quantity, does the amount of light that comes back differ from the amount of light that went into the disk?

A. Yeah. If you assume for a moment that the reflectance of the data layer were 100 percent -- incidentally, I neglected to mention mechanically or physically what pits are.

They're small depressions in the data layer or bumps; depressions or bumps, depending on which direction you're looking at the data layer from. But those pits, those small depressions or bumps, have

exactly the same reflectance as the lens which surround them. So there's no difference in that. So the -- the pits affect the light by scattering it.

Q. So back -- back to my question.

A. Yeah.

Q. Does more light come back than -- than went in, or does less light come back?

A. I was trying to answer your question, but I had to make the -- I was going to make the assumption and I was trying to justify the assumption.

Let's pretend for a moment that the data layer reflectance is 100 percent. Then about half of the light that comes -- that is -- that actually goes forward is -- is coming back into the lens.

Q. Okay. So less light comes back than went into the disk?

A. That's correct.

Q. And is that a bad thing?

A. No, that's a good thing.

Q. Why is that?

A. Well, in the case of disk recognition, you can use that to help you recognize the type of disk which has been put into the drive.

Q. And -- and if I'm trying to play the CD or DVD, does the difference in the amount of light or the

effect of pits have any impact?

A. Yes, they do.

Q. Now, when this light comes back that is reflected off the pits and the data layer as indicated by this white line, what happens to it?

A. As I mentioned before, because of the beam splitter or the action of the beam splitter, the light coming back down gets reflected off to the right and finds its way onto this array of photo -- photodetectors.

Q. What do the photodetectors do?

A. A photodetector is a device which creates electric signals, and it will emit an electrical current, and the current that comes out of the photodetectors is directly proportional to the amount of light that falls onto it.

So if you double the amount of light onto a photodetector, you'll double the amount of current that it generates.

Q. Let's try to simplify that.

Light goes into the photodetector. What comes out?

A. An electrical signal.

Q. Now, to the right of the photodetector all the way to the right of the figure, there's three blocks in

the right-hand corner.
A. Those three blocks right there (indicates).
Q. What are those?
A. Those represent particular circuits which are contained in a -- a large chip or electronic -- array of electronic circuits, which is called the drive controller.
Q. Which does the controller do?
A. The controller controls the action of the drive in all -- in this particular case, it controls the action of the drive during the disk recognition -- recognition process.
It also controls the action of the drive when you're trying to read information from the disk or write information to the disk.
Q. Now, there's something called CPU and memory. What are those two things?
A. The CPU is a shorthand for computer processing unit. It's just a computer. And it's the computer that actually sends signals to all the circuits within that controller.
But just like any computer, this computer -- its actions are controlled by a program, a software program, and that software program resides in the memory, which is shown here.

Q. Okay. Can you explain what a software program is at a high level?
A. A software program is a series of instructions which is machine-readable. In this particular case, the machine is the computer.
It reads those -- those instructions one by one and performs operations according to what those instructions tell it to do.
Q. Now, above all of that and kind of in the middle, there's a dotted line circle and something indicated as spindle motor action.
What does that indicate?
A. Well, we mentioned earlier that the disk itself is mounted onto a turntable or a spindle, and that dotted line indicates the axis of the spindle, and the circular dotted line indicates the fact that the spindle is rotating.
And because the spindle rotates, the whole disk rotates as well.
Q. Okay. And now let's go back to how you move the lens system. There's a block at the top right that says focus and track motor drivers.
Do they have any influence on how the drive is able to move the focusing lens?
A. Excuse me. Yes, that's correct.

These drivers emit -- this particular circuit caused focus -- called focus and track motor drivers emit signals or currents to the focus and tracking motor. And then the focus motor will move the lens up and down, and the tracking motor will move the lens back and forth or in the radial direction of a disk in direct proportion to the strength of these signals, which are issued by the -- by the motor drivers.

Q. Okay. So the -- the focusing lens can move up and down; is that right?

A. That's correct.

Q. And it can move radially along the disk, correct?

A. That's correct, left and right in this cartoon. The left and right, yes.

Q. Let's look at the last block and, hopefully, we then have an overview of the system so we can move on.

The last block is laser and servo systems control. What does that do?

A. Well, first, let's talk about the laser control action first. One of the things you need -- you'll see over on the left here, laser is -- is -- is called a CD/DVD laser. And that's really because if it's not -- if it's not a two-wave-length laser, then it

really represents two different lasers.

A -- a particular laser needs to be used when the CD is being played, and a DVD laser needs to be played -- be used when a DVD disk is being played. So this controller will select which of those two lasers is energized, depending on whether a CD or a DVD -- a CD disk or a DVD disk is -- is -- is recognized to be mounted in the drive.

And then the servo controller, this controller chip actually sends signals up to the focus and motor driver, which -- and those signals which go into the focus and motor -- the focus and track motor drivers tell the focus and track motor drivers how much current to deliver to these -- to the focus and tracking motor in order to move the lens a prescribed distance, and that distance is prescribed by the controller.

Q. Now, there's a CPU and memory indicated here. Is that in the computer or is that in the drive?

A. It's in the drive.

Q. Now, does the computer also have a central processing unit and a memory of its own?

A. Yes, it does. The computer -- the computer will be running a software -- a software program like Word or -- I don't know -- you might be on the internet or something like that.

And when it wants to write or read information to the -- to a -- to the disk, it will send instructions to this computer in the -- in -- in the -- in the controller -- in the disk drive controller, and then the disk drive controller will cause the drive to operate in a way which is compatible with the instructions that the -- the user's computer sent to it.

Q. So for the user to use this disk drive, does the drive need to be plugged into the computer?

A. The drive needs to be plugged into what's known as a bus, which is a connector which certain signals cross -- go across. And those signals are well-defined, and this -- the computer we had out here earlier has such a bus in it.

And when the drive is plugged into it, everything works because the signals that are sent by the computer across the bug -- bus are understood by the drive on the other side of the bus.

MR. TROP: Wendy, can we move to Demonstrative Exhibit 24, Slide 6?

Q. (By Mr. Trop) Now, this is labeled tracking servo system. What's a tracking servo system?

A. I think we -- we earlier talked about the fact that the lens itself could be moved in the radial direction of a disk. And we also, I think, mentioned

that the whole optical head could be -- could be moved in the radial direction of the disk.

So the tracking servo system is the system which coordinates the moving of a whole head and the moving of the lens to bring -- bring everything together along the radial direction of the disk.

Q. So at the top of this slide, there's something called -- it's something in green. What's that representing?

A. Well, that represents a cross-section of the disk.

Q. Okay. And what is meant by target track?

A. Well, the bottom line -- we don't -- we don't show the data layer here buried inside of the disk, but the data layer is -- is -- in this little cartoon is on this little surface right here (indicates).

And the target track indicates -- and that little yellow dot is the location of a particular track on that disk which you would -- you want the spot of light to be focused onto.

Q. Okay. Now, what's all this stuff below the disk? What is all that?

A. Well, these two lenses and the beam splitter and the photodetector and the laser we've already seen in the -- in the previous slides. And we also have a

little cartoon here which indicates the motor which moves the lens back and forth in the radial direction.

Q. Let me just interrupt.

What's the whole thing?

A. The whole thing, that whole -- that whole -- all those components are housed in a little assembly or casing which is known as either an optical head or an optical pickup unit.

Q. And so can the optical pickup unit be moved as a whole?

A. Yes. The optical pickup unit is mounted onto something, a component called the sled, and the sled usually rides on rails. And that sled -- those rails allow the sled to move in and out in the radial direction. And the sled is powered in that radial direction or moved in a radial direction by this thing called the sled motor, which appears in the lower right.

Q. I thought you said that the lens could move in different directions, including the radial direction.

A. That's correct. The sled is designed to -- to move the whole unit in a -- in course -- like, for example, if you wanted to jump from one track to another track on a -- on a compact audiodisk and you might have to move the whole pickup head by 10 millimeters or 20 millimeters, the whole -- the sled would move the whole

shooting match by that 20 millimeters.

And then the lens would precisely locate the focus spot on the particular track that you're looking for.

Q. Okay. Now, what is the thing labeled sled motor at the bottom right-hand corner of the slide?

A. That's the -- that's the motor that moves the whole sled, the whole pickup unit.

Q. We're calling it a sled, but I think you said it actually rides on some rails, correct?

A. It's just generically called a sled. It's terminology that's been used in the industry for years.

Q. So the sled motor moves the whole pickup unit, correct?

A. Yes.

Q. And then what does the lens motor do?

A. The lens motor just moves the lens itself in the radial direction. The lens motor that's illustrated here moves it in it radial direction.

MR. TROP: Your Honor, we have a Quanta drive that we would like to open up and show to the jury.

THE COURT: Okay.

Q. (By Mr. Trop) Could you go ahead and open up Plaintiff's Exhibit, I believe, it's 197.

It's held together by tape at this point, I believe.

A. I took it apart earlier and taped it back together, because my old eyes will not let me find all the screws.

Q. So let me know when you get it apart.

A. I'm almost there. Duct tape. Okay. I think I'm ready.

Q. Okay. Can you show a disk on that partially disassembled drive?

And you're going to have to hold it up, because I don't know if people can -- everybody can see.

A. Yeah.

Q. If you can basically do all that.

A. I just pulled the drawer out, as you can see, and the disk, of course, goes in and fits on the little hub. And then once the disk is on there, the drawer goes back in, and it won't go back in now because I've got all the screws out of it, so...

Q. Okay. Now, can you point out where the sled is in there?

A. Well, I've taken the back cover off. Let me do this. Here you -- now you can see the whole drawer action.

And if I turn it over, you can see these

two -- two rails here. And this whole assembly, which is the optical head, slides back and forth along those two rails. And there's a little worm-screw assembly which is attached to a motor, which causes that action -- that movement.

Q. I can't see it from over here.

MR. TROP: Can people see that okay?

THE WITNESS: Can everybody see it? I guess we can have the bailiff, I guess, hand it.

THE COURT: Would you like to publish it to the jury?

MR. TROP: Yes, we would like to publish it.

THE COURT: Thank you, Mr. McAteer.

A. And if you turn it over on the other side, you can see the glass lens itself. And that little hub in the center is where the disk is mounted to spin.

Q. (By Mr. Trop) Can you actually see that movement of the focusing lens on that sample?

A. Yes. If you just take your finger and poke the lens, you can see it moves up and down and back and forth in the radial direction.

You won't hurt it. Just go ahead and do that, if you like.

Q. The lens is just about an eighth of an inch

piece of circular-looking plastic?

A. Yes. Well, it's more like about three-eighths, I think.

One other component -- when the drive comes back to me, I'll point out the controller in the drive for you as well.

Thank you.

The optical head itself is connected to this little circuit board by this ribbon cable, which has many, many little conductor lines in it. And on this circuit board, this big, black piece of plastic, you see that's the controller itself. So that contains all those circuits that we were talking about earlier.

MR. TROP: Wendy, can you put up Demonstrative Exhibit No. 9?

Q. (By Mr. Trop) Basically, we have this in dual view here, I suppose. So what's on the screen and what's on the board are the same thing.

Can you identify what's on the board as a pictorial representation of Claim 3 of the Kamatani patent?

A. That's correct.

Q. Now, what does Claim 3 of the Kamatani patent seek to accomplish, in your opinion?

A. It -- it talks about a method for recognizing

the sort -- a method or means to be used to recognize the sort of disk that's been inserted into an optical disk drive.

Q. Okay. And what does it do with that information, if anything?

A. I think we mentioned earlier, once it determines the type of optical disk, it sets up the drive so that it can read information from that particular type of disk.

Q. Now, have you analyzed the Quanta drive relative to Claim 3?

A. Yes, I have.

Q. What things did you look at to do that analysis?

A. I looked at the -- the software programs which causes the optical drive to -- to operate, that give the controller its instructions, operational instructions, during the disk identification process.

I analyzed several Quanta drives themselves. I looked at testimony from engineers from Quanta, and I also looked at the answers to what are called interrogatories, but written descriptions from Quanta itself about how their drives work during the disk discrimination or disk identification process.

Q. Were you able to look at some of the Quanta

drives physically?

A. Only by taking them apart, yes.

Q. So from these materials that you reviewed, the software, the interrogatory answers, and the depositions, were you able to -- what were you able to learn?

A. I was -- in my opinion, I was able to learn that these drives do indeed infringe Claim 3 of '981.

Q. What did you learn from your initial review of all these materials?

[redacted]

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[redacted]

Is that okay?
A. That's fine.
Q. Now, at this early stage, were you able to determine from what Quanta told you how the drives with the Philips controllers operated?
A. No, not at all.
Q. Why is that?
A. The written answers about drive operation from Quanta Corporation and the testimony given by the Quanta engineers during their depositions indicated that they did not understand how those drives worked during the disk identification process.
Q. So what did you do?
A. Well, I had previously taken apart and analyzed completely drives from another manufacturer which had the same Philips controllers in them, and also to the best of my ability, to determine from the Quanta software that I had, they were running the same software.
And so what I did was, I an -- I used the analysis of that previous drive and applied it to the Quanta drives that ran the Philips -- that were running the Philips controller in the software.
Q. So what was the nature of the analysis of the previous drive that you had?

A. It was a full, logical analysis in which I did a flow chart which illuminated every step that the drive performed during the disk discrimination or disk determination process.

Q. And why did you do that?

A. The -- in order -- in order -- the first time you look at a particular controller and software that -- that is running in that controller, you need to really have an indepth understanding of everything that it does so that you can then use that indepth understanding to locate the particular steps which are of interest with respect to Claim 3.

Q. And so how did you use that analysis to analyze the Quanta parts?

A. What I did was I used that an -- an -- that -- that analysis and applied the Court's claim construction to Claim 3 -- to each particular element of Claim 3 and looked to see if that particular step was in Claim 3.

Q. Okay. So with respect to the Quanta parts, did you do a flow chart for the entire flow of the Quanta parts?

A. Not for the Quanta parts, no.

Q. And why is that?

A. I didn't need to, because we already had it for the -- I already had the entire flow chart from the

previous part running the same controller.

We're talking about the Quanta parts with Philips controllers at this point?

Q. That's right. So we're just talking about those for now.

And so how were you able to use your prior analysis to analyze the Quanta parts more easily?

A. Well, the entire analysis I had done before. As I said, I could recognize the portions of that -- of that procedure, which corresponded to each one of these claim elements. And if it was there, then -- if that procedure was there, then it read on these claim elements.

Q. So did the prior analysis enable you to focus on particular portions of the Quanta source code?

A. Yes.

MR. TROP: Let's put up, just as an example, the source code for the SDW87. It's Plaintiff's Exhibit 1163.

[redacted] REDACTED BY ORDER OF THE COURT [redacted]

Q. We're not talking about that anymore.

A. Okay.

Q. So this is just an example of source code. We're really going to -- I guarantee you we're not going

to go into this in any kind of detail.

A. You should illuminate the lower half. The top is just comments.

Q. What we were trying to do is just show you --

A. That's better.

MR. TROP: Can you just take a section and blow it up enough so people can see it?

Q. (By Mr. Trop) So -- so this is just a piece of source code, and what I'm trying to get you to do is, could you explain what this is and how you go about understanding this?

A. Well, this is a human -- it's called source code because it's human-readable version of the software which is stored in memory and actually causes the -- the computer on that controller chip to operate.

And in this human-readable memory, the first -- the first thing you see that's written in a -- in a strange language, so you have to be familiar with this language. The language is called C++ programming language.

The other thing that's of interest is that when you go through a source code like this, you have to -- a lot of it is not of interest to what you're trying to find. So even though this source code is contained in the -- in the -- in the portion of the

source code which is relevant to the disk identifi -- inserted disk identification procedure, not every line is of interest to that.

There's lines in here, for example, which are put in in order just to test the controller chip or test some operation of the drive.

And, finally, it's not -- it's not written line-by-line or page-by-page like a novel is. When you're -- when the computer is actually being instructed by this thing, it might -- it might be instructed by a few lines, and then the next instruction might be several pages away. So you really have to sort of navigate your way through it.

It's very hard to look at -- at something like this, which is just a listing, an English -- an English text listing of the source code and make any sense of it.

Q. We're showing a little portion of the source code. Can you -- can you estimate how extensive the source code would be for each Quanta drive?

A. Well, the source code that would be related to the entire disk operation might be 50, 60 pages long, and each page would have 50 to 60 lines of instructions like this on it.

Q. How big is the source code that governs --

A. The source code that governs the entire operation?

Q. Right.

A. Thousands of pages.

MR. TROP: So let's look next at Plaintiff's Exhibit 107.

Q. (By Mr. Trop) So can you indicate what Plaintiff's Exhibit 107 is.

A. This is a -- something called a flow diagram. And it's a flow diagram for the procedure which occurs in a particular disk drive when that particular disk drive is determining what type of disk has been inserted into it.

And what it is, is a -- a sequential -- it's a graphical illustration of all the sequential steps that that drive performs during this particular disk integration process.

So what we've done is we've unjumbled or unscrambled all the source code, which was on that page that was previously shown on the screen, and put it into a block diagram so that this block starts -- the procedure starts up here; then that block is performed and that block is performed and that block is performed, et cetera, et cetera.

So it's more intuitive -- intuitive. And when

you have it in this sort of a thing, you can really understand what's going on, when you represent it this way.

Q. But, Dr. Howe, this isn't for a Quanta part, is it?

A. No, it's not.

Q. Okay. So what use did you make from this analysis in connection with your analysis of the Quanta products?

A. This was for a disk drive which had a MediaTek controller. And a couple of disk drives with MediaTek controllers, I performed a complete logical analysis on and was able to produce flow charts from them.

So just as with Philips flow chart, we now have -- I now have got a very good understanding of the disk identifi -- the steps involved in the disk identification procedure which is executed by drives which use MediaTek controllers.

Q. Okay.

MR. TROP: Let's just take -- can you just page through the pages of this and -- so this is the first page, and can you just show the full page and let's just see -- so let's just stop there.

Q. (By Mr. Trop) So when you go from the first page, what's the connection to the next page?

MR. TROP: Well, this is the first page of the source code. And let's go to the next page now.

Q. (By Mr. Trop) And how do I jump from Page 1 to Page 2?

A. Well, you'll see there are blocks -- there's rectangular blocks in this flow diagram, which illustrate particular operations, and then there's these diamond-shaped blocks. Those are decision blocks.

So when the operation falls into one of these diamond-shaped blocks, depending on whether the decision discussed in that block is yes or no, you'll -- you'll take a different path. And some of those paths may lead you to different pages.

Q. Okay.

MR. TROP: Let's go through the -- can we just kind of go through them real quickly here, Wendy?

Q. (By Mr. Trop) So there's a number of pages in this document. It goes on and on, and so it just keeps going through in kind of a sequential or a step-order process?

A. Yeah. There's so many blocks here -- because as I said before, this is a full logical analysis, and so it illustrates every minute step which is -- which is performed by the -- by the drive when it's determining what type of a disk has been inserted into it.

And a lot of those steps -- steps may be superfluous or very minute, but, you know, everything is there. And you need to do that when you -- when you're trying to get a complete understanding of a particular operation of controller in software, you have to do this.

Q. So, Doctor, how did you -- did you map out every one of these steps yourself?

A. I had -- actually had a graduate student that works in my laboratory draw these -- these flow charts, and he did a -- if you will, an analysis of the software.

Q. And what was your involvement?

A. I supervised him.

Q. Okay. And what was his involvement?

A. He actually put this particular source code into a computer program which is known as an editor. He was able to determine all the various functions, all the -- and call out the various steps with that editor, and then that editor allowed him to very easily -- I shouldn't say very easily. This represents about a week's work, full-time work.

Q. Okay. So what did you do versus what he did? I just need to get it clear.

A. Well, I supervised him. You know, I think I

said in my deposition that he did the heavy lifting. He was the stevedore. I told him what boxes to pick up and where to put them.

MR. TROP: Now let's go to Demonstrative Exhibit 5, Slide 7.

Q. (By Mr. Trop) And I take it -- is this the next sequence in your kind of methodology?

A. Yeah. This -- one of -- one of the elements in Claim 3 of the '981 patent calls for processing an optical signal. And in the rectangular box there, we've just identified the two particular steps --

Q. Well, let's just -- can you just point out to the jury, so they see the link -- can you actually see this board?

A. I can't see that. I'm sorry.

Q. Okay.

A. Oh, there it is. Okay.

That's where it -- it's that little blue thing that says processing an optical signal.

And so from the -- I don't know -- hundreds of steps in the flow diagram, these are the two which are relevant to processing the optical signals.

So this is -- this is the portion in the -- in the software that's running on the controller, which actually does the processing of the optical signal.

Q. And, again, to be clear, this is an analysis of -- this is not an analysis of a Quanta drive, right?

A. No. This is an analysis of a -- of a -- of another manufacturer's drive, which is also running a MediaTek controller.

And as I said earlier, I grouped these into two parts, and I found that all the drives that run MediaTek controllers behave in a similar fashion, and all the ones running Philips controllers behave in a similar fashion.

Q. So why is this analysis helpful with respect to the Quanta drives?

A. Well, if I take this analysis and I identify exactly what functions or what steps I'm looking for, from now on, when I go to look for the same steps in the -- in the software that's operating on actual Quanta drives, I don't have to do the full flow chart. I can just go find the equivalent functions in that -- in that Quanta software.

Q. Okay.

MR. TROP: So can we go to the next slide?

Q. (By Mr. Trop) And what is this?

A. This is a -- shows some similar steps in that -- that long -- that big flow chart that was shown

earlier, which are germane or relevant to the collating the processed optical signal step, which is down here in the second claim element of Claim 3.

Q. Okay.

MR. TROP: And then the next slide, please, Wendy?

Q. (By Mr. Trop) What is this one?

A. And this is -- this is -- identifies the step in that -- in that -- that long flow chart which is relevant to settling modulation of the servomechanism, which is down here in the last claim element -- or the third claim element -- excuse me -- of Claim 3.

Q. So in this example, what information do you have that's useful at this stage in your analysis?

A. At this step, I know what -- what sections of the -- well, first of all, all this -- in this particular case, this is MediaTek software.

So the MediaTek software is organized relatively -- more or less in the same -- the same for all versions of it. So I now know which sections of the MediaTek software to go look for things, and I also know what I'm looking for.

Q. Did you have any reason to believe that the MediaTek software would work similarly, and the Philips software would work similarly?

A. The only reason to believe that -- no, I had no reason to believe they would work -- well, I had reasons to believe they would work differently, because they are made by an entirely different companies.

Q. No. I'm talking about each one.

A. Oh, yeah.

Q. So let's take the Philips.

Did you have any reason to believe -- or let's take MediaTek.

Was there a reason why you -- did you have any information at this stage that led you to believe that MediaTek controllers would work similarly?

[redacted]

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[redacted]

Q. Okay.

MR. TROP: So let's go to the next slide now.

Q. (By Mr. Trop) So what does this slide show?

A. Okay. On the right-hand column, this is -- this is the model number of the drive that you just previous -- we just showed the flow chart for.

This was the previous drive from another manufacturer that I did the complete logical analysis of. And each row in here shows what I consider to be, if you will, a major step in the disk discrimination process.

And in using the method that we just talked about in the last -- in the last 15 minutes or so, I was able to find each of those steps quite easily -- or not quite easily, but readily in -- in the Quanta SDW -- in the software for the SDW087, which is a Quanta drive.

And I've listed some pages here in the software where you can find each of these steps. And -- and -- and I show in each of these columns, if you care to read them, the equivalence of the steps between the two types of drives.

And both of these drives -- this is the MediaTek controller, again, running MediaTek software, and this is a MediaTek controller here also running MediaTek software.

Q. So did you use the same analysis for all the Quanta -- this same methodology for all the Quanta

drives?

A. Yes.

Q. Now let's move to the MediaTek drives.

MR. TROP: And could you put up Demonstrative Exhibit 24, Slide 11?

Q. (By Mr. Trop) Okay. What's depicted here in -- I guess you would call it cartoon form?

A. Yeah. Again, this is -- on the top is a DVD disk, and on the bottom is a CD disk. And, again, we show them cut in half so that you can see the data layer within -- that is buried in the plastic substrate.

Remember, the total disk is a little bit more than 1.2 millimeters thick, and you'll see in the DVD that the data layer in the DVD is about .6 millimeters behind this front transparent plastic surface.

And in a CD, it's about twice that or 1.2 millimeters behind that transparent surface.

Q. Now, we didn't show a dual-layered DVD, but where -- where would the second layer of a dual-layered DVD be?

A. The second layer in a dual-layer DVD would be about 60 -- .06 millimeters above this first one.

Q. So now you've got these dimensions on there.

Do some disk-makers put their single-layer DVDs somewhere else other than .6 millimeters, if they

want?

A. No, they cannot.

Q. Why not?

A. If -- if -- the depth of that layer has to be at a specified distance or else the lens that focuses the light coming out of the DVD layer would not form a precise optical spot on the data surface.

Q. Well, but if somebody wanted to do it, is there any reason why they couldn't design it a different way?

A. Well, the -- that -- the size of the pits, the space -- the track pitch that we talked about earlier, plus the depth of the data layer is all specified in the DVD standards documents.

So you could -- if you built a disk differently, you could not call it a DVD, because it wouldn't adhere to the DVD standards.

Q. So what is a DVD standard?

A. DVD standards is a set of specifications, which is published -- I believe the group is named the DVD Forum. And they're published so that if you build a disk to all the regulations and rules, which are set forth in these standards, then that disk is guaranteed to play on any DVD disk drive.

Q. Are there standards for CDs, too?

A. That's correct. There's a similar set of standards for the CDs.

Q. Okay. And so does the configuration of the pits on the data layer influence where the data layer has to be located?

A. Yes. Because the size of the pits and the track pitch require a certain size focus spot to be trained on them when you're reading the disk, if you want to read the disk reliably.

And you're only going to get that particular size focus spot if you use a lens ---if you use a lens which is designed to image light, to focus light through the specific specified thickness of plastic.

Q. Okay.

MR. TROP: Can you go to Slide 12, Wendy?

Q. (By Mr. Trop) What is this showing?

A. This shows just the very startup of a disk where a user has placed a disk, either a CD disk or a DVD disk, on the tray of a -- of a -- of a disk drive.

Q. So to be more realistic, I guess you'd have to have a computer around this, too, I take it?

A. That's correct.

MR. TROP: The next slide, please.

Q. (By Mr. Trop) Okay. Now, this slide, I think, is broken in two. What's on the left side first?

A. You know, we've been showing little cross-sections of disks all along.

The left is the cross-section of a DVD disk, and you'll see that down here is just air, and then here's the transparent surface through which light is -- is -- goes in and comes back out (indicating), and it --

Q. So the light actually comes from the bottom; is that right?

A. Yeah. The light actually -- in this case, the light actually comes up from the bottom, as I'm showing with my laser pointer here. The light comes in that direction.

Q. And so that's why, when you look inside these things, you don't see all the heads and everything is because they're underneath.

A. Uh-huh. Yeah.

And the data layer is shown here (indicating), and in the DVD, as we mentioned earlier, this data layer is .6 millimeters behind this transparent surface.

Q. Okay. And what's -- what's shown at the top here underneath the letters DVD? What's that trying to show?

A. Well, it may be a little -- a little hard to see, but these little circular arcs here are meant to be the data tracks -- separate tracks which line up with

these little sawtooth -- excuse me -- rectangular indentations in the data layer here (indicating).

Q. Okay. And what's on the right side?

A. On the right side is a similar cross-section for a CD.

And the major difference is that the track pitch on the CD is twice what the track pitch on the DVD is. And the -- and the data layer is -- is 1.2 millimeters behind this -- 1.2 millimeters behind this transparent surface versus just .6 millimeters behind the transparent surface.

Q. Okay. All right.

MR. TROP: So let's get to the next slide and get this started up.

Q. (By Mr. Trop) So what -- what just happened? Something just jumped on the screen.

A. Yeah.

Q. What happened?

A. This depicts the beginning of a -- well, it depicts a focus scan or a focus search operation. And the focus search operation in this slide has progressed to the point where the lens has moved up to -- to -- to the point where the focus spot of light is just touching the transparent data surface of a DVD disk.

Q. So let me back you up. What's this red thing here (indicating)?
A. That's the focus beam of light coming in there.
Q. Okay. So that's the laser?
A. That's the laser beam at the point of focus from the lens in the pickup head, yes.
Q. And the action that the -- that -- we've stopped the action of the laser; is that correct?
A. We stopped the -- we stopped the action of this, because the laser was coming from below up, and we've stopped it just to the point where the focus spot of light is -- is just touching the transparent surface.
Q. It doesn't do that in real life, right?
A. It doesn't stop. It keeps -- it goes in one continuous motion, yes.
Q. And how -- is the speed of the scan controlled?
A. The controller controls and knows exactly what the velocity is at which this -- this beam of light is -- is going -- is journeying -- journeying through the disk.
Q. Now, in this cartoon, there's something shown as counter. What's that trying to indicate?
A. Well, that's a counter. And -- and one method

of identifying the type of inserted disk is to use a counter and a counter which may be started, for example, exactly at this point.

So when this occurs, when this beam of light touches this transparent -- first touches the transparent surface during a focus scan, a counter would be started.

And here we show the counter just prior to being starting, and its count zero is zero.

Q. Okay. And this is a simplified depiction; is that --

A. It's very simplified, yes.

Q. All right.

MR. TROP: Let's go to the next slide.

Q. (By Mr. Trop) What happened now?

A. Well, this is a -- sometime later in that same focus scan, where the lens has moved further up so that the focus beam of light now is no longer trained or occurring on the transparent data surface, but now it's actually located on the -- I'm sorry -- the transparent disk surface, and now it's located on the data surface on the disk.

Q. And again, it didn't actually stop there; it would just keep on moving?

A. It would just keep on moving, yes.

Q. Okay. And I take it the counter's changed. What does that represent?

A. Well, this shows that the counter had countered from 0 to 2,000 in the time it took the lens to move the focus spot from the transparent front surface of this up to the data layer.

Q. And is that information useful in determining disk type?

A. Yes.

Q. And why is that?

A. Because you can compare that information to a counter value which is stored in the -- in the software program to identify the type of disk.

Q. Okay.

MR. TROP: Let's go to the next slide.

Q. (By Mr. Trop) This slide is labeled compare timer time to stored value.

What does that indicate?

A. Well, that shows you an example of that stored value.

In this particular case, the stored value might be a counter value of 3,000. And so it says, okay -- oh, by the way, I forgot to mention that the counter is stopped.

Remember, the counter was started just when

the focus beam of light touched the transparent surface of this, and it stopped when it reaches the data layer. And so the accumulated count during that time was 2,000. And so this constant says, well, since the count that was accumulated in this counter was below 3,000, then it's a DVD disk.

Q. Okay. Now, we talked about light reflecting back from the data layer. Is that happening right now?

A. Light is always being reflected back to the data layer, right.

Q. And is that -- is that used in any way in the process that's being depicted in this slide?

A. It is, yes.

Q. And in what way?

A. Well, it's -- the light -- the light reflected back while this is going on is called the optical signal.

And as we mentioned before, that light finds its way onto the photodetectors, and certain electrical signals are generated from that light or from that optical signal. And I think we'll see those in some slides coming up.

Q. And are those reflected optical signals used in any way in connection with these counts?

A. Yes.

Q. And how is that?

A. Well, the reflected opt -- the reflected optical signal is what's used to start the counter and stop the counter when the light touches these two surfaces, as I alluded to earlier.

Q. Okay. And when the light hits the data layer, is there any reflection from those pits on the data layer?

A. As I mentioned earlier, the -- during this focus scan, the light will always illuminate more than a single track. And so since there's pits on those tracks, yes.

Q. Okay. So when we look at the claim language, the claim language says processing an optical signal reflected from encoded pits on an optical disk, does that happen?

A. It happens, yes.

And there might be some -- some wondering about the term encoded -- the adjective encoded in front of pits. The fact that the -- the pits are encoded because they have different lengths. If they were not encoded, every pit would -- it would be the same length.

So because the pits have various different lengths, they're encoded. Information is -- that's the way you encode information in the pits by varying their

lengths.

Q. Well, let's just go back to the question.

Now, the question was, is there a processing an optical signal reflected from encoded pits, and is there any question in your mind that that happens?

A. No. That happens.

Q. Are you sure that happens?

A. I'm sure that happens.

MR. TROP: Now let's go on to the next slide.

Q. (By Mr. Trop) What happened now?

A. Well, the -- now we've -- we've -- on the right, we're showing also a focus scan, but this time a CD disk, rather than a DVD disk, has been inserted into the drive.

And this focus scan is shown at the point where the lens has moved the focus spot of light all the way up through the transparent data surface of the disk onto the data layer of the -- of the CD.

And you'll see that if the counter were started as before, when this -- when this beam of light just touched the transparent surface and its count was zero -- and now, in this case, it indicates the counter has achieved a value of 4,000 by the time the -- the focus spot of light has traveled up to just touch the

data layer.

Q. So, now, what do you compare these counter counts to?

A. Again, in this particular case, some -- some value which is stored in the software program, which resides in the memory in the controller.

And if that -- if that value that was stored were 3,000, we would see -- in this case, we would have recognized a DVD disk, because the 2,000 is less than 3,000.

Whereas in this case over here, we would recognize a CD disk, because the 4,000 is greater than 3,000.

Q. Now, where does that stored value -- how does that stored value get determined?

A. I mentioned earlier that for a given controller, like, for example, a MediaTek controller, the software is pretty similar. It's written by engineers at MediaTek who design and manufacture the controller.

And then that software is -- let me call it personalized by the disk drive manufacturers for use in a particular disk. And probably the -- the main way in which they personalize that software is to put these stored values in, which are particularly specific to a

particular drive.
So, for example, one model -- model -- if you look at this model of -- this stored value of 3,000 here, one drive might have 3,000. Another drive might have 3,025 or 3,250 in it, something like that.
Q. Let's go back. Where -- where did -- how did these get determined?
A. They got determined by the drive engineers by experimenting, by putting various disks in that particular model drive and determining what values needed to be in there to -- to make this disk recognition process work reliably.
Q. What did they do?
A. As I said, they would take lots of DVDs and lots of CDs, put them in the drive, and then make these measurements.
Q. Well, why would they do that?
A. So that the drive will operate -- so -- so that particular drive will reliably recognize DVDs or CDs that are put in.
Q. Well, what are they looking for in these disks that they put in? What information are they trying to get out?
A. Well, one piece of information, they could monitor these signals which are generated during these

focus scans.

Q. Okay. But relative to this, what -- what -- when they do the -- before they design -- when they're designing the drive and they're putting these stored parameters in, what do they -- what information do they get when they test all these disks?

A. I don't understand your question. I'm sorry.

Q. Okay. So how do you come up with this stored parameter?

A. Well, they experiment with various disks.

Q. Okay.

A. And during the experimentation, they will find the particular stored parameters which apply best to that particular drive model.

Q. Best in what way?

A. So that the DVD/CD disk recognition process works reliably.

Q. So do they look at a characteristic of those disks they test?

A. Again, I'm sorry. I just don't understand what you're getting at.

Q. So when they put this information in there, how do they know this depth test is going to work?

A. Well, they observe that it works with -- in the laboratories when they're doing experiments.

Q. So is that what they do the experiments to find out?

A. Yes.

Q. Okay. So they go to the lab, and they do a bunch of experiments, and they find out what this stored value should be.

A. Should be --

Q. And then what do they do with that stored value?

A. -- for a particular drive.

I'm sorry?

Q. What do they do with that stored value?

A. Then they put that stored value in the software, which is -- which operates the controller for that drive.

Q. And so how do they know, for any particular CD or DVD, that stored value is going to work?

A. How do they know for any particular CD or D -- well, because they have tested a whole range of CDs and DVDs, not just a single one.

Q. Okay.

A. So the stored value is one which works with CDs and DVDs from a whole different group of manufacturers.

MR. TROP: So let's move on to the next

slide.

Q. (By Mr. Trop) Okay. So now, we're kind of going to explain some more details about the process we've just seen.

Could you explain what's shown in green in this slide?

A. Well, again, it's a cross-section of a disk. It's not indicated here whether it's a DVD disk or a CD disk, but now the disk is on edge rather than -- so the disk is -- is oriented -- oriented vertically now instead of horizontally, as it was in previous slides.

Q. Okay. So now we show -- what's the red on the left here?

A. The red on the left indicates the focus beam of -- the focused laser beam being moved from left to right during a focus -- a focus scan.

And here it's shown where that beam of light is focused short or to the left of the outer transparent layer of the disk.

Q. Okay.

MR. TROP: Can we go to the next slide?

Q. (By Mr. Trop) Okay. What happened now?

A. Okay. Now, the beam -- the lens has been moved to the right to a large enough distance so that the focus beam of light has actually penetrated through

the outer layer of disk -- layer of the optical disk.

Q. What does this row labeled SBAD indicate?

A. All right. That row down there indicates a signal -- remember, what happens as this focus scan is going, as you have light reflected back in the detector, which is the optical signal, back into the optical head, which is the optical signal, and that falls on a photodetector, which generates various signals, one of the signals that's generated is this signal called S-B-A-D, or SBAD.

And this shows what the SBAD signal looks like up to the point of the focus scan at which the focus spot of light has just penetrated through the outer layer of the disk.

And you'll see there's this little low-amplitude kind of hump or what we call a low-amplitude peak in the SBAD signal.

Q. Okay. And there's a word, threshold. What does that indicate?

A. The way this peak is detected by the circuitry in the controller is a threshold is -- is set up, and that threshold is -- is also a voltage level.

And so when the -- when the SBAD peak level exceeds that threshold level, some circuitry will be turned on, which will measure and store in a -- in a

hardware register in the controller the actual level of this SBAD peak, the actual amplitude of that SBAD peak.

Q. Okay. Now, where does the threshold come from?

A. The threshold is one of those values, which is experimentally -- experimentally determined by the drive engineers and placed into the software, which resides in the memory of the controller.

Q. Okay. So does the threshold just test whether or not that bump is big enough?

A. That's correct. It determines -- it allows the circuitry that measures the amplitude of that bump to basically be turned on.

Q. And the next line down is another little graph, and this one is labeled focus error. What's that?

A. Well, another signal that's generated during the focus scan or focus search operation is called the focus error signal.

And this shows you what the -- what the focus error signal looks like up to the point where the focus -- the focus spot of light during the focus scan has just penetrated through the outer layer of the disk.

Q. So we're not going to get into everything about this, but there's something different about the

shape of that signal. Can you give a high-level explanation as to why that looks like that?

A. Well, due to the fact that when this focus light is -- is -- is -- penetrates through this outer surface, some low-level reflectance gets back into the -- into the -- into the optical head, and it cause -- eventually causes a little squiggle to occur in the focus error signal.

Q. Now, are both of these the result of light reflecting back from the data layer?

A. That's correct. They're -- they're the result of light coming back from the entire disk, because although it's not shown, the light from this focus beam goes all the way through the data layer and gets reflected off of it simultaneously while it's being reflected from the front surface.

Q. Okay. So I misspoke. At this stage, most of the reflection is primarily off the transparent surface.

A. The largest component of reflection at this stage is from the transparent surface, that's right.

Q. But these signals indicate reflection, right, not incoming light?

A. That's correct.

Q. Okay.

MR. TROP: Let's go to the next slide.

Q. (By Mr. Trop) Okay. What happened now?

A. Now -- this depicts a later time in the focus scan at which the light has moved -- the lens has moved, so the focus point has now moved all the way over and actually has penetrated through the data layer of the disk.

Q. Okay. And what happened to the -- on the SBAD line?

A. Well, as the light penetrates through the data layer, another peak occurs in the SBAD signal. And what we're trying to illustrate here is that this particular peak is sharper and it certainly has a much higher amplitude than the first peak, which is -- which corresponds to the penetration of the outer data layer by the focus beam of light.

Q. Now, do the nature of the pits on the data layer affect the appearance of that second SBAD peak?

A. They certainly do. The amplitude of this peak and as well as its sharpness are affected by the nature of the pits and the depth of the -- of the data layer inside the plastic disk substrate.

Q. And when you talk about amplitude in this example, is that just the height of the peak?

A. That's the height of the peak.

Q. Okay.

A. It affects the height of the peak and the sharpness of the peak.

Q. Okay. Now we have another threshold. What -- what is that threshold?

A. That -- that threshold is a higher threshold than the former one. That threshold is used so that the circuitry in the controller can discriminate the peak that corresponds to the penetration of the data layer by the focus spot of light during the focus search.

So -- so you'll see that -- when just this one threshold is -- is exceeded, it -- the circuitry knows that the peak corresponded to the outer layer. When both this and this threshold are exceeded, now the circuitry knows that the peak corresponds to a data layer.

Q. So this second threshold, how is that determined?

A. That second threshold is determined in a similar manner to the first.

The drive engineer would insert lots of disks from different manufacturers in a test drive of a particular model and determine what threshold should be used to reliably cause this peak to be -- to be found during a focus search.

Q. Okay. Now, with respect to the counter

starting and stopping that we talked about in the example we gave, what -- what effect does this threshold -- this blip have?

A. Okay. In this -- in the sample example we gave earlier, the occurrence of this particular peak above this threshold would start the counter, and the occurrence of the second peak above that threshold would stop the counter.

Q. And what is this time? What does -- what does that mean?

A. Well, the counter -- the counter is kind of like a clock, which is ticking along at -- let's say it causes one tick every half second or something like that. And so the number of -- the counter -- the number -- the count values can be directly related to time.

So in my example, if it was a half -- if it was a half second per count and you got to 10 counts, then at a count of 10, it would have been 5 -- it would have been 5 seconds.

Q. Okay. And now moving to the next line, the focus error line, what happened in that reflected signal as a result of the light shining on the data layer?

A. Okay. As the light trans -- as the focus beam of light goes through the data layer, that is, when it's

just short of the data layer, you're going to get a negative peak in the focus error signal.

And then as the light approaches and goes through the data layer, this signal is going to go from this negative peak up to a positive value, and then it's going to fall back down again as the light transits or keeps going beyond the data layer.

And so you get these pair of peaks in the focus error signal. That pair of peaks, as well as the straight line area connecting them is known as a focus error signal S-curve.

Q. Now, in the -- in the analysis of the depth test, that used the SBAD signal, correct?

A. I'm sorry. I didn't hear you.

Q. In the depth test that we talked about previously, that used the SBAD signals?

A. Oh. Well, you measure the time, yeah. Then you use the SBAD signals, that's correct.

Q. And in connection with the focus error signal, how do you determine these thresholds here?

A. Again, those thresholds are determined in a similar fashion. They're -- they're -- they're determined experimentally for each drive model by putting various disks from various manufacturers and determining which threshold makes the drive operate most

reliably.

Q. And what is the use of those thresholds?

A. Those thresholds -- just -- just as the thresholds in the SBAD peak were used to determine when either a low-amplitude or a high-amplitude peak in the SBAD signal occurred, this threshold here is used to determine when a negative peak in the -- in the focus error signal of a -- of a -- of a high enough amplitude occurs.

And this one basically tells you when a high-amplitude positive peak -- basically, it tells you when the -- when the S-curve formation has been completed.

Q. Okay.

MR. TROP: Next slide?

Q. (By Mr. Trop) Okay. So is this slide showing focus error S-curves?

A. Yes, it is.

Q. Okay. And on the left, it says there's a DVD disk, and on the right, there's a CD disk, right?

A. Yeah. This depicts the S-curves that would be obtained if you did a focus scan using the DVD laser. On the left -- in this case, on the left, it illustrates the case in which a DVD disk had been inserted in a drive; on the right indicates the case in which a CD

disk had been inserted in the drive.

Q. So why are these amplitudes or heights of the S-curves different?

A. The -- for various optical reasons. If you use the right laser with the right disk, you're going to get a higher amplitude of -- peak-to-peak amplitude in your S-curve than if you use the wrong laser for a particular disk.

So here, it senses a DVD laser and a DVD disk. We see that the focus error S-curve has a high peak-to-peak value, whereas if -- if it were -- if that focus scan were done using a CD disk, you'd also get an S-curve, but it would be -- have a lower value than if you had used the laser which is compatible with the type of disk that had been inserted.

THE COURT: All right. We'll take a morning break, Ladies and Gentlemen. Be ready to come back in the courtroom, I guess, at 10:25. Remember my instruction about not discussing the matter.

(Jury out.)

THE COURT: You may step down.

Please be seated.

Ms. Dupree has called my attention to the fact that several of the exhibit folders tendered by the Quanta Defendants have a statement in them -- this is in

Exhibits 122 through 125 inclusive, 129, 133, 134, 135, 136, 137, 147, 152, and 154 -- that this exhibit was not printed due to size; that counsel for the Quanta Defendants has retained a copy in electronic format and will make it available upon request.

At this time, you have nothing in the record. I mean, I don't know, on the appellate court, something in the record that's available upon request -- these are exhibits that don't exist in the record in this Court.

What do you say about that, Mr. Parker?

MR. PARKER: Well, Mr. Wilcox had contacted the Court to try to determine what would we do about it. What we're talking about -- and they're not going to be used during the testimony -- are big boxes that contain thousands of pages of source code.

THE COURT: Well, how do you want to use -- how do you want to preserve them for the record, Mr. Parker?

MR. PARKER: I think we can do it with a CD.

THE COURT: Well, that's what I assume, and the CD is going to have to be marked and received.

MR. PARKER: Yes, sir.

THE COURT: At this point, they're not

here, and I'm just telling you, if you want to perfect your record with them, we've got to have something. This will not suffice.

MR. PARKER: I understand, sir. We will.

THE COURT: Okay. Thank you. See you at 10:25.

COURT SECURITY OFFICER: All rise.

(Recess.)

(Jury in.)

COURT SECURITY OFFICER: All rise.

THE COURT: Please be seated.

All right. Let's continue, please.

MR. TROP: Put Demonstrative Exhibit 24, I think it's Slide 21, back up.

Q. (By Mr. Trop) Okay. So at the bottom of this slide, we have the words right laser and wrong laser.

What did you mean by that?

A. Again, the -- this is a scan with a DVD laser, focus scan with a DVD laser. And if a DVD disk happens to be inserted in the drive during that focus scan, then you get an S-curve, which has a high-peaked peak and short peaks as well.

And if a CD disk is -- happens to be inserted, then the S-curve in the focus error signal would have broader peaks which are lower amplitude. And the

higher -- the higher peak-to-peak value indicates which is the right laser.

So in this particular case, you know which laser it is, but you don't know which disk it is. And so you can tell the type of disk by looking at the -- the peak -- the peak-to-peak, which is for the right laser; in this particular case, the DVD disk.

MR. TROP: Okay. Let's go to the next slide.

Q. (By Mr. Trop) And is it basically the same thing with the CD laser?

A. That's exactly right. It's the same thing with the CD.

Q. Okay.

A. Except the CD laser is now being used for the focus error scan?

Q. So in this case, the CD disk has the more pronounced S-curve.

A. That's correct. And that indicates the CD laser is the right laser.

MR. TROP: Okay. Let's go to the next slide.

Q. (By Mr. Trop) Now, what -- what does this slide depict?

A. In the first column on the left are the -- it

indicates the various steps in the disk discrimination process of which are relevant to the Claim 3 of the '981 patent.

Q. Okay. There's two columns. The first one is Philips. What does that indicate?

A. That column indicates the -- what we found to be the portions in the Philips software, if you will, which corresponded to the various steps of -- of -- of the patent, which are illustrated on the first column.

Q. So what do you mean when you use the word we?

A. Well, I mean me. Sorry.

Q. All right. So do all the accused -- does the second column cover all the drives that are accused that have Philips controllers?

A. Yes, it does.

Q. And what does the third column cover?

A. That's a similar column, and it applies to MediaTek controllers and software and relates to all the drives which use those controllers and software.

Q. So are there any other Quanta drives that are MediaTek or Philips?

A. Not that I know of.

Q. So all the accused drives in this case are covered by those two columns?

A. I believe that's correct.

Q. Okay. Now, in the left column, there's the word processing.
Could you point out where processing comes from in the claim, if anywhere?
A. Again, if I may point to the chart down there, processing is prominently within the first element of Claim 3.
Q. Where does the word pit configuration come from?
A. Well, that's also in -- in Claim 3 in the first element.
Q. Okay. And what does pit configuration indicate? Is that CD or DVD, for example?
A. That's correct.
Q. And the next one is total number of layers. Where does that come from?
A. That's also in the first element of Claim 3.
Q. And what does total number of layers relate to?
A. That would relate to whether a disk has a one data layer or two data layers.
Q. And moving on down, now we have collating. Where does that come from?
A. Collating is mentioned in the second element of Claim 3.

Q. And settling, where does that come from?
A. That's mentioned in the third element of Claim 3.
Q. Where did you get focusing lens servo from?
A. If you look at the two clauses which are attached to the third element of Claim 3, they mention a focusing and tracking servo function.
Q. Let's go through your analysis for the Philips parts.
With respect to pit configuration, you have the word -- across from pit configuration, you have the words focus scan.
What does that indicate?
A. The step that is used to do the processing step in the Philips controllers is a focus scan. That's the first thing that happens. A focus scan is initiated and carried out.
Q. And what does the information in parenthesis underneath that indicate?
A. It says the pit configuration is identified by determining the peak of the SBAD signal, the highest peak in the SBAD signal that occurs during a focus scan, and then relating that peak to a gain value, which is how much amplification needs to be applied to the SBAD signal by an amplifier within the drive in order to have

the SBAD signal have a certain electrical strength.

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

Q. Now, can you see this demonstrative exhibit -- I think it's Demonstrative Exhibit 22?

A. I need to stand up, if I may.

MR. TROP: Is there a -- well --

THE WITNESS: I can see it, if I stand up.

MR. TROP: Okay. Is that alright, Your Honor?

Can you see, Mr. Parker? You got it okay?

MR. PARKER: I got it.

MR. TROP: Okay. Thanks.

THE WITNESS: I can see it on the screen now, so that's fine.

MR. TROP: I appreciate it.

Q. (By Mr. Trop) What does -- this -- this slide is -- this board is labeled focus scanning laser must form an optical signal reflected from encoded pits.

What does that mean?

A. That shows -- these are three little cartoons which -- let's just concentrate on the two on the left. The first shows a little blowup of three data tracks in a CD disk. And the middle one shows one, two, three, four, five (counting) data tracks in a DVD disk.

And the red blobs, which are superimposed on those data tracks, indicates the size of the core of the focused light spot, which occurs when the focus scan,

using the right laser, not the wrong laser, but the right laser is exactly focused on the data surface of the disk.

Q. What do you mean core?

A. A core would be, in this particular case, the -- if you -- if you look at the intensity of light in the focus spot, it's kind of like a bell-shaped distribution. It's most intense at the center of the spot. And then it falls off gradually as you go to the outer edges of the spot.

And the core might be something -- we're -- it might be the diameter which the intensity falls to 50 percent of what it is at the maximum value in the center of the spot.

Q. Is that the same effect, if I take a flashlight and shine it at a vertical surface, I'll see like kind of a bright area in the middle and then a less bright area kind of surrounding that?

A. More or less, yes.

Q. And so the actual illumination of laser light is even bigger than this core that's shown in this picture?

A. That's correct.

Q. Now, the claim language says that you need to process an optical signal reflected from encoded pits on

an optical disk.
In your opinion, is there any way, any possible way that that process optical signal does not reflect from those encoded pits?
A. No. I would also like to point out that during the focus scan, this is the smallest the spot will ever get, and most of the time during the focus scan, this spot of light will illuminate 5, 10, 20, 30 tracks because it's out of focus.
This is when it is exactly incident, right on the data surface. And my answer is no, there is no way that you could reflect light from that -- that surface without it being affected by the pits. And -- and --
Q. What if it was the wrong laser?
A. With a wrong laser it's even bigger.
Q. What if it was a DVD disk with a CD laser?
A. It's even bigger. This is the best it can possibly ever be.
MR. TROP: All right. Can we go back to the former slide?
Q. (By Mr. Trop) Okay. So moving down to the collating step, could you explain the collating step?
A. Well, would you like me to explain it with respect to Philips or MediaTek?
Q. No, no, no. Just what -- what did you

understand the collating step, based on the Court's definition?

A. Well, what you do is you process the object -- you process some signals and you get some value from the -- from that processing step, and then you compare it to that value -- to another value to store in memory.

Q. And is that done in the Philips and MediaTek parts?

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

Q. Okay. Now, the claim talks about the optical disk standards data.

What is that, in your understanding?

A. In my understanding, the optical disk standards data are the -- the -- the specifications on a disk, including the -- what the data surface looks like, which are -- which are contained in the -- in the DVD and the CD standards documentation.
Q. Okay. Now, does the optical disk standard data have to be exactly the same in every single drive?
A. In every single disk.
Q. No. In every single drive.
A. Well, by standards data, do you mean the comparison of values that you're comparing the signal processing to?
I'm confused.
Q. We'll read the claim here.
A. Okay.
Q. We'll walk through that.
It says collating the processed optical signal with optical disk standard data.
A. Yes.
Q. So where is the optical disk standard data?
A. The optical disk standard data would be data which is stored in memory which corresponds to a particular one or the other types of pit configurations.
Q. Okay. And would that information have to be identical in every single drive?

A. No. It would probably be different in each drive, because it would be personalized for that particular drive model.

Q. Well, if the DVDs are all the same and the CDs are all the same, why would the information be different in the drives?

A. Well, for example, one drive may move the lens at a different velocity during a focus scan than another drive might, and so that means the counter value, which discriminates between the two types of disks, would have to be different.

Q. Let's move on to settling.

Could you explain the settling step.

A. Once the drive has determined -- determined what type of disk has been inserted into it, either a DVD or CDD -- a CD, it has to set itself up so it can read that particular type of disk.

Q. Okay. And how is settling done, if it is, in the -- in the Quanta parts?

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

Q. And with respect to the focusing lens servo

and the tracking servo, were you able to confirm whether those were present in the Quanta parts?

[redacted]

REDACTED BY ORDER OF THE COURT

Q. Now, are you aware of any non-infringing use of these devices?

A. I'm not aware of any, no.

Q. So based on your 40 years of experience in the field, do you have an opinion as to whether Quanta -- all the Quanta drives accused in this case infringe Claim 3 of the '981 patent?

A. I do.

Q. And what is that opinion?

A. I believe they infringe.

Q. Are you sure they infringe, Dr. Howe?

A. I'm sure they infringe, yes.

THE COURT: Pass the witness.

CROSS-EXAMINATION

BY MR. PARKER:

Q. Good morning, Dr. Howe.

A. Good morning.

Q. I believe we have met before, and my name is John Parker.

A. Good morning, Mr. Parker.

Q. You said you are currently a research professor?

A. That's correct.

Q. Does that mean you no longer teach classes?

A. That's correct.

Q. As a research paper (sic), is it your responsibility, then, to author papers once you have completed research on a particular project?

A. If I choose to, yes.

Q. It's been quite a while, though, since you've published in a peer-reviewed journal, is it not?

A. Generally, I publish when a graduate student has been -- is about to get his degree, and then we have a flurry of papers which are related to the work that he's done to prepare his dissertation. And I haven't had a graduate student graduate now in about four years.

Q. Okay. So it's been about four or five years since you've done that?

A. I believe so. That's right, yeah.

Q. And in that time period, really, you've been concentrating more on being an expert witness than on your job as a professor?

A. Not at all.

Q. So what portion of your income is derived from your employment with the university versus what's derived from appearing as an expert witness?

A. Actually, currently, I'm not taking any salary from the university. I'm taking all my contract money and supporting my graduate students with it.

Q. But my question is -- let me rephrase. From your pursuits, other than being an expert witness, can you compare your respective incomes?

A. Well, I have no salary. I'm not taking any salary from the university. I think your question was what percentage, based on my university -- so it's infinite, because I'm dividing by zero.

Q. So your income is solely from your work as an expert witness?

A. No. I have a full pension from Kodak. I have a fairly nice Social Security benefit, et cetera, et cetera, plus I also do a bit of consulting, quite a bit

of consulting on the side.
Q. Consulting in regard to?
A. There's two projects I'm working on. One has to do -- actually, we're writing a patent on a technology I invented for antipiracy and anticopying from DVDs and CDs.
Another has to do with forensic use of signal processing, which is done on CDs and DVDs. And I'm working for two different companies on that.
Q. I'm sorry. I didn't mean to interrupt you. Go ahead and finish.
A. I'm working for two different companies on those two different areas.
Q. Now -- but a substantial amount of your time over the last four or five years has been spent as an expert witness, has it not?
A. It comes and goes.
Q. In fact, you've testified in a previous case or been an expert in a previous case involving this very same Plaintiff in this very same patent, have you not?
A. I think that was in 2005, yes, or 2004. I can't remember.
Q. And if I heard your testimony at the end of your direct examination, it's your position that all the QSI drives infringe Claim 3 of the '981 patent?

A. That's correct. The QSI drives that are accused in this case infringe, and I think there's like 20 of them.

I make no claims about all QSI drives, because I don't know what they are.

Q. Now, you understand that this patent is a process patent, do you not?

A. Met -- I was thinking it was a method patent.

Q. Or method patent. That's fine.

A. Yes.

Q. Okay. And to analyze a method patent, reviewing the source code is a critical step in determining whether or not there is infringement.

A. That's one of the ways to do it, that's correct.

Q. Okay. And, in fact, didn't you say yourself, the only way to get an in-depth or very precise description of how drives operate is through the logical analysis that the firmware affords?

MR. TROP: Objection, Your Honor. That's an improper use of the deposition.

THE COURT: Well, he asked him a question. I don't know whether he's asking from the deposition or not. Overruled.

A. Answer the question?

Q. (By Mr. Parker) Yes, sir.
A. All right. The -- I'm sorry. I forgot the question now.
Q. Well, that's fine.
Isn't it your position that the only way to get an in-depth or very precise description of how drives operate is through the logical analysis that the firmware affords?
A. Sure. I agree with that. When you're dealing with new parts and new firmware, you have to do that, that's correct.
Q. And what is meant by a logical analysis of firmware is that you review the source code to determine the operational flow of the source code for the relevant processes; isn't that correct?
A. That's not what I meant by the statement that you're asking me about. What I meant by the statement you asked me about is to do a complete flow diagram.
Q. Okay. And you did do a complete flow diagram with respect to two drives manufactured by a company called Asus, did you not?
A. I did.
Q. And they had MediaTek drives?
A. MediaTek -- I'm sorry. Did they have MediaTek what?

Q. MediaTek chipsets.
A. That's correct.
Q. I misspoke, and I apologize. MediaTek chipsets.
And you did a detailed analysis of some BenQ drives some years ago that had Philips chips in it.
A. That's correct.
Q. Okay. Now, isn't it also true that with respect to both the Asus drives -- two Asus drives and however many BenQ drives were involved, you did a complete source code flow chart?
A. I did it for two Asus drives and one Philips drive, that's correct.
Q. And you have not done that for any QSI drives?
A. That's correct.
Q. Okay. And isn't it true that the charts that you were shown during the direct examination that indicated flow charts examining firmware or source code with respect to chipsets from ODD drives were from drives other than QSI drives?
A. That's true.
Q. You weren't shown a single flow chart or source code analysis related to a QSI drive?
A. That's correct.
Q. And --

A. Just a second. You said a single flow chart for source code analysis.
I'd like to amend my answer to say I did not show a single flow chart for a QSI drive.
Q. Right. And you haven't done --
MR. PARKER: Let me just get some water, Your Honor. I'm sorry.
Q. (By Mr. Parker) And you haven't done a detailed source code analysis and prepared a flow chart for a single QSI drive.
A. If you mean a detailed analysis includes preparing a flow chart -- is that right?
Q. (Nods head.)
A. That's correct.
Q. And you did -- you did look somewhat at three QSI drives, did you not?
A. Well, I looked -- well, what do you mean by look at a QSI drive?
Q. Did you perform what you described as a cursory examination of three QSI drives?
A. No. I believe I used the term in my report, limited examination, which means that I compared the source code of those QSI drives with steps which I found in the flow charts for those other drives.
Q. But you did not compare, even with respect to

those three drives, all of the source code involved in the identification process with all of the source code in the disk identification process in any of the other drives that you had done a complete analysis of.

A. My comparison was focused on comparing the rele -- the portions which were relevant to the Claim 3 claim elements.

Q. But you didn't even compare all of the elements for Claim 3 for the three that you did the limited analysis on; isn't that a fair statement, sir? And, remember, it's just what you did in your February 9th report.

A. The -- some of the -- some of the -- I compared portions of all the QSI software -- software that I had -- source code software that I had.

Q. Okay. But that was not a complete software or firmware comparison and analysis for even those three drives; is that a fair statement?

A. Some -- some portions of the software were not there, that's correct.

Q. Now, let's look specifically. One of the three that you looked at and did your quote/unquote limited analysis was the QSW (sic) SBW243; is that correct?

A. I think that's right. I'd have to look at the

report to be sure.

Q. Do you need a copy of your report? I can get it for you.

MR. PARKER: May I approach, Your Honor?

THE COURT: Yes.

THE WITNESS: Could you tell me what page to look on?

Q. (By Mr. Parker) I cannot tell you what page on your report, although I believe that the identification of the QSI drives that you looked at is all in one section. Maybe page --

A. I think -- I think it's behind that. Let me just make -- I believe it was like in Section 1.5 or something like that.

Here it is. Section 1.5.4, Analysis of the QSI SBW243. Is that what you're looking for?

Q. Yes.

A. That's on Page 36 on Section 1.5.4.

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

[redacted]

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[redacted]

[redacted] on source code.

Q. All right. But you did not actually perform a detailed analysis of any drives with the MT, that's MediaTek, 1685PE chipset, did you?

A. Well, the Asus --

Q. Doctor, you can explain your answer, but I want to know if you have performed a detailed analysis of any drive that has that precise chipset in it that is MediaTek 1685PE.

Yes or no, sir.

A. I believe I have, yes.

Q. You believe you have?

A. Yeah. I think that the Asus 2424A has that chipset in it.

Q. It has a chipset in it with the Model No. MT 1685PE?

A. It doesn't have the PE, but I believe the PE returns --

Q. It has a different model number, doesn't it?

THE COURT: Well, now, wait a minute --

MR. PARKER: I'm sorry.

THE COURT: -- Mr. Parker.

THE COURT: Let him finish his answer.

MR. PARKER: Yes, sir. I'm sorry.

THE COURT: If it's nonresponsive, you object.

MR. PARKER: Yes, sir.

THE COURT: I'm running this courtroom, okay?

MR. PARKER: Yes, sir.

A. It's my understanding that the PE at the end determines the type of package for that chipset and not the functionality or the circuitry in the chipset.

Q. (By Mr. Parker) That's your opinion.

A. That's my opinion.

Q. Have you done anything to confirm that with MediaTek or anyone else?

A. That's based on many years of looking at datasheets for chipsets.

Q. So if you're wrong, then the answer is, you have not done a complete analysis of any drives with an MT 1685PE chipset.

A. If I'm wrong, you're right. That's correct.

Q. In fact, you compared the 243 with the Asus SBCB2424A (sic), right?

A. I said I did a flow chart for the 24 -- the

Asus 2424A, and then I applied the methodology that we were talking about.

So for the 2424A and for the DV -- the Asus DVD-E61682, we have two flow charts. From those flow charts, I got a very good overall view of all the detailed steps which are used by Asus controllers -- I'm sorry -- MediaTek controllers and MediaTek software during the disk identification process.

From that, I gleaned the function -- the software functions, which I deemed to be relevant to -- to disk discrimination identification by Mediatek software. And I looked for those same functions or similar functions in the QSI source code.

Q. But you did not prepare a complete flow chart for the 243, did you?

A. I already admitted that. True.

Q. So you couldn't sit down and this jury won't be able to sit down and compare the flow chart you did for the Asus drive with the flow -- with any flow chart that you've done for the QSI drive?

A. That's correct.

Q. Okay. And you can't say that the source code for the 243 drive is identical to the source code for the two Asus drives you analyzed.

You can't say that, can you?

A. I would -- I would venture that no two sets of soft --

THE COURT: Answer the question he asked you.

THE WITNESS: Sorry.

A. You're correct. I can't say that.

Q. (By Mr. Parker) And you can't point out what, if any, differences there are in the two?

A. Not as I sit here, no.

Q. Okay. And it's not in your expert report.

A. That's correct. It's not in my --

Q. And you haven't done any experimentation or analysis that would enable you to do that.

A. I'm not sure the answer to that is yes.

MR. TROP: Your Honor, can we approach?

(Bench conference.)

MR. TROP: Your Honor, Judge Everingham said that he could not rely on the analysis that he did based on the use of the text version.

That question directly implicates, and a truthful answer should allow him to bring it up. But he doesn't want to violate the motion in limine.

THE COURT: Well, he's -- he will not be violating the motion in limine since adverse counsel invited that answer. He may answer the question.

MR. TROP: Thank you.

(Bench conference concluded.)

THE COURT: You may answer the question fully.

THE WITNESS: Answer the question fully?

THE COURT: Yes.

THE WITNESS: I'm sorry. I need to have the question read back.

MR. PARKER: Strike it. I'll move on.

THE COURT: Okay.

Q. (By Mr. Parker) Your expert report as of February of this year does not contain that kind of analysis; that is to say, side-by-side analysis of the source code from the Asus drive with the source -- with the source code from the QSI drive?

A. That's correct.

Q. Okay. And isn't it true that the only way that you could definitively say that the source code in the 243 is identical to the source code in the two Asus drives is to do a line-by-line comparison?

A. If you -- if you look at the word identical -- yes. Literally -- literally, I can't say they are identical. That's correct.

Q. And your report did not do that?

A. No, it did not. No.

Q. Now, let's go to the SDW085. Do you understand that's one of the other QSI drives that you did what you described as a limited analysis on?

A. And that would be on the next page, Section 1.5.5?

Q. Yes, sir, I believe it is.

A. Okay.

Q. I think I have them in order --

A. Okay.

Q. -- out of your report.

[redacted]

[redacted] REDACTED BY ORDER OF THE COURT

[redacted] not on the chipset. I didn't analyze the chipset.

Q. Okay. I understand. Let me rephrase the question.

[redacted]

A. That's correct.

[redacted]

A. Please tell me what you mean by a detailed analysis.
Q. Complete flow chart.
A. I did not do a complete flow chart.
Q. And you based your opinion, again -- your analysis of the QSI085 on your analysis of MediaTek chipsets in the Asus SCB2424A and the Asus DVD-E616A2.
A. That's not entirely correct. I based it on the flow charts which I got from the source code for those -- the chipsets in those drives.
Q. In those drives?
A. That's correct.
Q. And for those drives, you did do a detailed analysis and prepared a flow chart?
A. I did.
Q. But you didn't do that for the QSI -- for this QSI drive either, did you?
A. That's correct.
Q. And those two optical disk drives contained MediaTek chipsets with different model numbers than 1888E, correct?
A. Which two optical disk drives?
Q. The QSI/SDW8 -- 085 contains a chipset with a different model number than the chipsets in the two Asus drives that you did the complete analysis on?

A. That's correct.
Q. Okay. And you cannot say that the source code for the 085 is identical to the source code for the two Asus drives that you did do the complete analysis on?
A. And, again, by identical, you mean line-by-line?
Q. Yes, sir.
A. I can't say that. You're correct.
Q. And similarly, you can't tell this Court or this jury what any differences are?
A. Not line-by-line, no, sir.
Q. Okay. And your expert report does not include source code flow drive (sic) for the QSI/SDW085?
A. I'm sorry. You said source code flow drive.
Q. I'm sorry. I misspoke.
Your expert report does not include a source code flow chart for the SDW085?
A. It does not.
Q. Okay. And the only way you could say definitively that the source code in the 085 is identical to the source code in the two Asus drives is, again, with a line-by-line comparison?
MR. TROP: Your Honor, bench conference, please.
THE COURT: I've ruled on that. He's

already -- you may answer the question fully, and you're not going to get to ask these questions and withdraw them when you put them in that context.

MR. PARKER: Yes, sir. I'm sorry.

THE COURT: You can answer the question fully now, but just --

A. If you mean line-by-line, again, I can't --

THE WITNESS: Well, I'm sorry, Your Honor. I've forgotten the question.

THE COURT: Read the question back please.

(The record was read.)

A. If you say identical literally, then I cannot do that; that's right.

Q. (By Mr. Parker) Yes, sir. Now, let's go to the 087.

Your analysis -- have you found that in your report?

A. You want me to turn to the 085?

Q. I'm sorry. I should have made it more complete.

A. That's on Page 38.

Q. The QSI/SDW087.

A. Yes, sir.

Q. Which I will refer to as the 087 to move

things along. Is that okay?

A. That's fine.

[redacted]

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[redacted]

Q. Okay. And you cannot say that the source code

for the 087 is identical to the source code for the two Asus drives you analyzed?

A. Again, identically, you mean line-by-line, no I cannot say that.

Q. And similarly, you can't tell this Court or the jury what the differences are?

A. A line-by-line, I cannot. That's correct.

Q. And your report does not include the source code flow chart for the QSI/SDW087?

A. There was no such flow chart in the report, that's correct.

Q. Now, let's talk about the drives with Philips controllers.

Isn't it true that drives with Philips controllers function in a very different way that the Asus drives you analyzed?

A. That certainly is correct.

Q. And so for the QSI -- and you might want to follow along in your report here, too. And I apologize for throwing out all these numbers, and nobody should have to remember them, because they will be available from documents.

[redacted]

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A. That's correct. If and only if the model -- the QSI model numbers you recited to me do, in fact, have Philips controllers in them. I don't know that they do or don't sitting here.

Q. I believe your report indicates that they do.

A. Oh, that's on the front -- is that on the front cover?

Q. I believe that it is.

A. Oh, okay. Well, you're probably correct then. I won't bother to check, just to move things along.

Q. Okay. You did not do a complete source code analysis, including preparation of a flow chart, for the five QSI drives that you compare to the BenQ drive.

Is that a fair statement?

A. That's correct.

[redacted]

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[redacted]

Q. Okay. But you didn't look at those three functions for the QSI drives, according to your report; is that correct?
A. That's correct.
Q. Even though they were critical functions?
A. I didn't have copies of them.
Q. You only looked at the start C?
A. The only copy -- the only library of functions I had was in start C.
Q. Okay. And you never actually visually compared the BenQ source code with the QSI source code, did you?
A. Please repeat the question.
Q. You never sat down and compared, visually or electronically, for purposes of preparing your report, the BenQ source code that you had done the complete analysis on with the source code from the five QSI drives that you compared it to?
A. That's correct. I no longer have the BenQ software.
Q. And you haven't had it for like four years, have you?
A. I destroyed it after that case was terminated, which I think was 2005.
Q. So to the extent you did any comparison at

all, it was based on your recollection of the BenQ source code?

A. And the -- I was told I was allowed to use the report, my expert reports that I issued in the BenQ case.

Q. Yes.

A. And so I used those as well.

Q. But those reports do not contain the complete BenQ source code, do they?

A. No, they do not.

Q. So the use of those reports did not permit you to compare line-by-line or otherwise the source code from the BenQ drive that you did analyze with the source code from the five QSI drives that you compared it to?

A. That's correct.

Q. And so there is no way you can sit here and say to this Court or this jury that the source code in the BenQ drive that you analyzed four years ago is identical to the source code in the five QSI drives with Philips controllers that you're opining about in this Court?

A. And by identical, again, you mean line-by-line?

Q. Yes, sir, line-by-line.

A. That's correct. You're correct.

Q. Now, for the remaining --

MR. PARKER: And could we have the chart up with all the -- lists all the drives on it, please, so we can put this into perspective?

No, all of them, please. I think there are 20 of them.

Q. (By Mr. Parker) You understand --

MR. PARKER: Let's don't let anything go away yet. Let's get them all up there.

Q. (By Mr. Parker) Do you understand, sir --

MR. PARKER: All of them, please. Thanks.

Q. (By Mr. Parker) Do you understand, sir -- and I won't make you play with your report -- that these are the 20 QSI drives that are accused in this case?

A. Okay.

Q. Okay.

MR. PARKER: And could you highlight the three that he did the limited analysis on?

Q. (By Mr. Parker) We've already talked about these three. They're the ones you did the limited analysis on that I asked you about, okay?

MR. PARKER: Go ahead and take those out.

Q. (By Mr. Trop) Now let's see -- and we've talked about these five. These are the ones, the

Philips drives --

A. That's right.

Q. -- that you compared to your analysis of the BenQ drives that you did some four years ago?

A. That's correct.

MR. PARKER: Take those out. And let's highlight the remaining drives.

Q. (By Mr. Parker) Now, with respect to these remaining drives, they are all QSI drives. You did not do even what you describe in your report as a limited analysis for these drives in your report?

A. I'm not sure -- in my report, that's correct. I did not do a limited analysis for those drives in my report.

Q. Okay. So there is absolutely no way that you can say definitively, based on the information in your report, that these QSI drives have firmware that is identical to the two Asus drives that you seek to compare them to?

A. I don't remember if I put the -- talked about those in terms of what I call the cursory analysis where I just looked for similar functions. I think I may have done that for those drives.

Q. Okay. Then let me rephrase the question. Based on your report, you cannot say that the source

code in these 12 drives is identical to the source code in the two Asus drives that you did the complete analysis of?

A. And, again, by identical, you mean line-by-line?

Q. Yes, sir, line-by-line.

A. That's right. I cannot say that.

Q. Yes, sir.

And isn't it true, sir -- and you can look at your report, if you need to, that you state in your report: I'm further informed that for there to be infringement of a patent claim, all elements of the claim must be met, either literally (literal infringement requires that each limitation of the claim be met exactly)...

Do you have that language in your report. Do you recall that?

A. Uh-huh.

Q. So what you're saying is that in order for a QSI drive to infringe Claim 3 of the '981 patent, each optical drive must satisfy each element of the claim exactly, correct?

A. Correct. Yeah.

Q. Okay. And the same -- and since Claim 3 is a process claim, or a method claim, if you prefer that,

isn't it true that you look at the source code to determine if the device satisfies each step of the claim?

A. Correct.

Q. And the only way you can opine definitively is with a line-by-line analysis.

A. I don't agree with that.

Q. You don't?

A. No.

Q. So it's your position that you can speculate that a line-by-line analysis would indicate that they were the same just because you think they're similar?

And isn't the word you used in your report, when you talk about your comparison of the QSI drives with both the Philips drives and the Asus drives with respect to the firmware, is that they are similar?

A. That's correct.

Q. Okay. And the level of analysis that gets you to the stage where you're willing to say that things are similar, is that the level of intellectual rigor and analysis that you would use in an article that you proposed for publication in a peer-reviewed journal?

A. If I defined similar, I would, yes. I would define similar in that journal -- in that paper. Excuse me.

Q. So that paper would contain a limitation in it in that you had not done an analysis -- a sufficient analysis to determine they were identical, but if you were allowed to use a similar standard, then you can define that standard?

A. I would define what the analysis means, that's correct.

Q. Okay. Let's look at some aspects of the '981 patent.

We're going to look first at the first element, processing an optical signal reflected from encoded pits on an optical disk until total number of data layers and pit configuration standard of the optical disk is identified.

Do you see that?

A. I do.

Q. Now, let's go to the slide you used with Plaintiffs, Slide 7.

Did you tell me this flowchart of source code was for the Asus drives?

A. Yeah. I think that's -- I believe that's for the DVD 61682.

Q. And that is an Asus drive?

A. That's correct, yes.

Q. Not -- in any event, not a QSI drive?

A. That's correct.
Q. Okay. And here you identify the function bScan_FE_SBAD as satisfying the, quote, processing element, unquote, right?
A. That's correct.
Q. And isn't it true that you cannot tell us where this function is in any of the QSI drives?
A. The QSI drives have a function, but it -- a function that performs similar operations. It has a different name.
Q. Is that pointed -- but it's not -- that is not pointed out in your report, is it?
A. That's not -- you're correct. That's not pointed out verbatim in my report.
Q. Okay. So for this processing element, isn't it true you didn't identify any source code function or functions in your report from any QSI drive that exactly satisfies this element?
A. I did not identify them by name.
Q. Okay. And isn't it true you didn't identify any hardware on any QSI drives that satisfy this element?
A. No. I don't think I made any comments about QSI drive hardware.
Q. Okay. Now, let's look at the second element.

Collating the processed optical signal with an optical disk standard data, which is stored in a memory.
Do you see that?
A. I see that.
Q. And you're familiar with that language?
A. I am.
Q. Now let's look at the same source code flow chart for the Asus product.
And isn't it true --
MR. PARKER: Can you put that flow chart back up, please?
Q. (By Mr. Parker) And isn't it true that you cannot identify for us any source code function or functions from any QSI drive that exactly satisfy this element, the element being collating the processed optical signal, and you do not do so in your report?
A. I don't do -- I don't do so in my report, although I have identified this -- source code lines which show exactly these steps. The names of the variables are different, but they're in there.
Q. But that's not in your report.
A. It's in my report implicitly and explicitly but not named line by line.
Q. So let's make it clear. There is no part of your report that points out what portions of the

firmware or what elements -- what sections of the firmware source code from a QSI drive perform this function that's pointed out specifically in the Asus drive.

A. I don't think that's true.

Q. You think that is in your report, that you have a comparison chart that shows the QSI firmware comparable to the Asus firmware?

A. I do.

Q. Can you show it to us?

A. It's Exhibit N. Exhibit N.

Q. Exhibit -- let's see it.

A. N as in Nancy.

Q. N as in Nancy. Okay.

MR. PARKER: Can we see that?

Q. (By Mr. Parker) I might have handed you my only copy of your report.

A. You're welcome to it, if you would like it.

Q. You say it's Exhibit N?

A. N as in Nancy.

Q. You're more familiar with your report than I am. I don't see it.

A. I don't think the exhibits are in your copy. I didn't see any exhibits in here.

MR. PARKER: May I have one moment, Your

Honor?

THE COURT: Yes.

(Pause in proceedings.)

Q. (By Mr. Parker) Is this what we're talking about, Dr. Howe?

A. That would be it, yes, sir.

Q. Okay. Now, tell me how this answers the question. And I'll repeat the question, if you don't recall it.

A. Yes. Well, I believe the question was, did I ever compare source code for a QSI part with the -- with the source code from the Asus parts that I did the flow charts for; is that correct?

Q. No. Did you -- does your report point out the specific -- and identify the specific source code from the QSI drives that matches up with the source code from the Asus drives for the collating the processed optical signal element?

A. Yes. If you look at the top of Exhibit N, on the left-hand column, it says we're reading from the SDW087, and it gives --

THE WITNESS: I'm sorry. Something happened here. At the top column -- the top of it. Way up top. There you go.

A. And it gives you the base number for the

source -- where the source code -- that's the starting base number of the source code I used.

Now, if you'll take that away and if you look on the left-hand side, you'll see the page numbers within that Bates number range, which each of these comparisons -- for example, the top one is Page 6, which compares to turn on the laser in the Asus drive.

Q. So is it --

A. I believe -- I believe that -- that source code for the 087 was like 40 or 50 pages long, and so I've just numbered the pages within the -- I didn't use Bates numbers; I just used page numbers.

MR. PARKER: Put them up side by side again, please, so -- if we can see that.

Q. (By Mr. Parker) So is it -- you're saying that even though these two items of source code do not read the same, it's your opinion they do the same thing?

[redacted]

REDACTED BY ORDER OF THE COURT

[redacted]

Q. So do you -- I'm just asking, you're saying

that even though they don't read exactly the same; they perform the same functions in your opinion.

A. Exactly.

Q. Okay.

A. And that's what I mean by similar.

Q. They don't read exactly the same, but in your opinion -- it's your view, they do the same thing, even if they don't read the same way.

A. You betcha.

Q. But we wouldn't even have to worry about that if you had actually sat down, for purposes of your report, and done the line-by-line comparison.

A. I didn't need to.

Q. Didn't need to --

A. Yeah. I had enough --

Q. -- or didn't have time to?

A. I had enough -- well, if I wanted to rack up a large bill, I could have done it, but I didn't need to. I had all the information I needed.

Q. You didn't think you needed to analyze definitively, on a line-by-line basis, even one QSI drive?

A. I found the functions I needed, and I found that they performed the same operations, and that's what I needed to do.

Q. Well, you analyzed two Asus drives, right?

A. I analyzed two Asus drives, because I've never done a MediaTek part before, and I wanted to get a good feeling for the -- of how the MediaTek source code worked.

When I looked at two different -- two different sets of source code and found out they behaved, quote, unquote, similarly, I had what I needed. I knew where to look in other source code to find the similar functions, and that's what I did.

Q. But if you had put them together, for purposes of your report, in a source code reader, you could give, you would agree with me, a much more definitive opinion.

A. If I could put any of your software in a source code reader, yes, I would do that.

Q. And that would give you the ability to make a more definitive -- give a more definitive opinion for purposes of your report. It would have done that. I'm sorry. I'm finished.

A. I think I answered the question. I said, if I had source code that could have gone in a reader, I would have done that.

Q. Okay. You would have done it, because it would have given you a more certain and more definitive analysis.

A. No. It just would have been a heck of a lot easier to find the functions I was looking for.

Q. Now, at some point in time, I believe you said during your direct testimony, that part of your basis for deciding that the QSI drives were similar in function to the Asus drives was testimony from a Quanta engineer?

A. I believe his name was Chen.

Q. Yes. And you say that he said they were similar?

A. I read his -- I think I pointed out in my direct that he did not say in so many words they were similar, but I read his explanation about the operation of each of the drives he was questioned on, and from that, my -- in my opinion, he -- he -- or should I say revealed a similar operation, at least to me.

Q. But his testimony was that they operated differently. Do you recall that?

A. They operated differently in fine points.

Q. He said they operated -- that each one of them operated differently, didn't he? And you recall that.

A. I recall that, yes.

Q. Okay. Now, on one of the charts that Mr. Trop showed you this morning, the -- or comparison charts, you had a chart that had a counter on it.

Do you recall that?

A. I do, yes.

Q. And it was counting time.

A. That's correct, yes.

Q. And the time count was compared to information that was stored in the chipset for parameters for either a DVD or a CD, correct?

A. That's correct, yes.

Q. Okay. And did -- and is the effect of your testimony, is that once that -- the information or the counter value is recognized, that the recognition process is complete; that is to say, the chipset at that point knows whether it's dealing with a DVD or a CD?

A. The -- the information of whether it's a CD or DVD at that point is stored in a register in the chipset, but that information has not been revealed yet because the comparison process has not been taken -- has not yet taken place.

Q. But I thought you said that there were -- there were time parameters both for a CD and a DVD.

A. No. Generally, the time parameter is -- well, what do you mean by CD or DVD?

Q. Okay. I'm just harkening back to your charts. You showed one that was like 2,000, and another, it was 4,000.

A. Oh.

Q. And if you said -- and I think you said, as soon as the timer realizes it's less than 3,000, it knows that it's a -- I can't remember whether that was a DVD or a CD.

A. Well, I think in the charts that you're referring to, the counter had counted up to -- and this is the time between -- the counter value is between the two SBAD peaks.

Q. Right. I understand.

A. The DVD, I believe it was 2,000 we used, and for the CD, it was 4,000 that we used.

Q. So once that -- once the chipset has that timing information, it has enough information to understand whether it's dealing with a DVD or a CD; is that a fair statement?

A. Well, no. The chip -- no, it doesn't. Because at that point in time, the chipset has processed an optical signal to the point where it's gotten some parameters from that processing. Now, it's got -- a parameter. In this particular -- in this particular case, the parameter is a counter value.

Now, to determine whether it's a DVD or a CD, it's got to take that -- that parameter, which it's calculate -- that it's determined and compare it to a

stored value.

And if that parameter is less in this case than the stored value, it's a DVD. If it's greater than the stored value, it's a CD.

Q. Okay. I think we're saying the same thing.

So once that counter value is processed so that if it's less than 3,000, it's one, and if it's more than 3,000, it's another, then at that point, the chipset realizes whether it's dealing with a CD or a DVD?

A. No. The chipset doesn't realize that until it performs a comparison of that counter value with a stored constant. That's when it realizes it's got a DVD or a CD on its hands.

Q. I thought I had that as part of my question, but maybe I didn't.

A. Okay.

Q. Once the chipset gets that information, that counter value --

A. Yes.

Q. -- information, and compares it to what's stored in there to tell it what counter value corresponds to a CD versus what counter value corresponds to a DVD, at that point, it's identified whether it's dealing with a CD or a DVD.

A. Yes. The comparison value is kind of like a counter value or threshold value.
Q. Okay.
A. Yes, I agree with you now.
Q. Okay. And I apologize if my question wasn't precise enough before.
So it doesn't -- although we know the light is reflected back, it doesn't have to be reflected back for that determination to be made.
A. I don't agree with that at all.
Q. It's just -- well, I thought it was just the light -- and I know this -- it's hard to talk in slow time with something that's happening instantaneously, but I thought that based on the chart you were looking -- being shown there, that you were just depicting the laser beam going into the disk --
A. I think --
Q. -- to -- I'm sorry. Let me finish -- to obtain that comparable counter values.
A. No. I -- if you followed the presentation completely, I think we tried to represent that the first peak in the SBAD signal turns the counter on, and the second peak in the SBAD signal turns the counter off. And the SBAD signal comes from light which is reflected back into the pickup head by the disk and subsequently

routed to the photodetectors.

That optical signal that falls on the photodetectors creates -- one of the signals it creates during the focus scan is the SBAD signal. And the peaks in that signal is what toggle the counter on and off.

Q. Okay. So is it your testimony, then, that the recognition process can't be completed simply by the analysis of that counter that occurs when the laser is, for want of a better term, going into the CD?

A. I'm sorry, sir. I don't understand your question.

Q. I'm just -- it appeared to me that two values were obtained -- timing value or a value was obtained -- a timing value was obtained as the laser penetrated the CD, and if the timing value was at a certain level, that meant it was a DVD and a certain other level, that meant it was a CD.

A. As the laser penetrates a surface of the disk, simultaneously while that is going on, the light is reflected from that surface back into the optical head onto photodetectors, and simultaneously while all -- continuously while all this is going on, while the laser beam is moving, this SBAD signal is evolving in time.

And that SBAD signal is what's processed to start the counter and stop the counter. And when the

counter is finally stopped, the terminal value of the counter is placed in a register in the hardware, and then that registered value is subsequently drawn out and compared with a value which is stored in firmware. And that's the collation step.

Q. Now, another thing you said was the focus error signal that you talked about -- in responding to Mr. Trop's question, you talked about the focus error signal S-curve.

Do you remember that?

A. I do.

Q. Okay. Now, the '981 patent process, is the use of the S-curve an essential part of its operation?

A. No. The '98 -- the '981 patent describes processing a signal. It doesn't -- it doesn't -- it's not limited to any particular signal.

Q. So why were we talking about the S-curve?

A. Well, actually, the '981 describes processing an optical signal. So the optical signal is the light that comes back into the head from the disk, okay?

And that light falls on this array of photodetectors. And a large number of signals results -- comes out of that photodetector, because there's many -- many little photodetectors in this photodetector array.

But the thing that generates all these signals, which are subsequently processed by the electronics, is the optical signal. So, in effect, the optical signal is what's processed.

Q. So is the processing of the S-curve, as you demonstrated in your direct examination, an essential part of the operation or process of the '981 patent?

A. The '981 patent says an optical signal has to be processed. It doesn't identify any particular -- it doesn't have -- does not identify any particular electrical signal that results from the optical signal being processed.

Q. But, in fact, in your example, the optical signal that processed -- was processed was the S-curve.

A. We were giving an example. I said, okay, in this the particular case, we're going to process the S-curve or process the SBAD signal, that's correct.

MR. PARKER: May I have a moment, Your Honor?

THE COURT: Yes.

(Pause in proceedings.)

MR. PARKER: Pass the witness.

MR. TROP: Your Honor, could we have a quick bench conference?

THE COURT: All right.

(Bench conference.)

MR. TROP: This is basically the chart that Dr. Howe prepared after he -- pardon?

THE COURT: Talk into the mike.

MR. TROP: Oh, I'm sorry.

This -- this chart is the chart that shows Dr. Howe's analysis where he found every single claim element in the source code using the version of the source code that could be analyzed.

I think you've ruled that that door has now been opened, so I just want clarification that I can go ahead and use this chart now.

MR. PARKER: Your Honor, I don't believe that door has been opened. It might have been opened had he responded to a question differently, but I posed every other question in regard to his February report.

And this -- this literally is Judge Everingham -- Judge Everingham found, I believe, would constitute litigation by ambush, because they had the opportunity to do this as early as late 19 -- as late as 2007 and chose not to, apparently -- well, time and expense constraints, and they shouldn't be able to do it to us now, because they only gave it to us a week before trial.

THE COURT: You through?

MR. PARKER: Yes, sir. I'm sorry.

THE COURT: Okay. Objection is still sustained just as Judge Everingham. I'm not going to allow you to show that exhibit now.

Yes, sir. That exhibit is what he ruled out, right?

MR. TROP: That's right, Your Honor.

THE COURT: Okay. That exhibit is out. I'm not going to allow him to expand his opinions other than what was revealed as per Judge Everingham, and he's limited it to the February report, has he not?

MR. TROP: I understand, Your Honor.

One -- one question, though, asked, could you have done a source code -- used a source code editor analysis, and he says he couldn't answer that question. He thought he was barred.

But he specifically asked him, could you have done -- could you have done this additional thing? Could you have used a source code editor?

And he said no, because he assumed he couldn't answer it. But he did. He could have, and he did.

MR. PARKER: I believe the question was, did you do it for purposes of your report, and I think I was careful about that.

THE COURT: Well, I believe that's what the question was, as best I recall it.

You know, he has testified that in his opinion, it meets every limitation, and he is willing -- he's just now reaffirmed his opinion that it was not necessary to do a line-by-line analysis.

MR. TROP: That's correct, Your Honor.

THE COURT: So --

MR. TROP: Move on?

THE COURT: Move on.

MR. TROP: Thank you, Your Honor.

(Bench conference concluded.)

REDIRECT EXAMINATION

BY MR. TROP:

Q. Dr. Howe, did any of the questions that Mr. Parker asked you have any bearing on your opinion whatsoever?

A. Not -- not -- not in the least.

Q. Did you do a sufficiently thorough analysis that you are completely confident in your opinion?

A. I am.

Q. Thank you.

MR. TROP: No questions.

MR. PARKER: Nothing, Your Honor.

THE COURT: All right. You may step

down.

THE WITNESS: Step down.

THE COURT: Yes, sir. Step down.

All right. Who will be your next witness?

MR. SANKEY: Your Honor, at this time, LaserDynamics would call Mr. Emmett Murtha, and he will be questioned by Mr. Greg Luck.

THE COURT: All right.

COURTROOM DEPUTY: Raise your right hand, please.

(Witness sworn.)

EMMETT MURTHA, PLAINTIFF'S WITNESS, SWORN

DIRECT EXAMINATION

BY MR. LUCK:

Q. Good morning, sir.

I'd like to ask you to introduce yourself to the jury, please.

A. My name is Emmett Murtha.

Q. Are you a damage expert on behalf of Plaintiff in this case?

A. Yes, I am.

Q. Before we ask you to identify your analysis, if I could ask you to identify your prior employment history.

A. Yes.

After college, I spent two years as an auditor with Arthur Andersen, and subsequently, 35 years with IBM Corporation, 21 -- 28 of which was in the Licensing Department of IBM, and during 14 of those years, I was Director of Licensing at IBM.

When I --

Q. I'm sorry. Go ahead.

A. Still working. But when I took early retirement from IBM 11 years ago, I formed my company, Fairfield Resources International, which is an intellectual property consulting firm.

Q. What were your responsibilities at IBM?

A. I was responsible for -- early in my licensing career -- well, my first seven years, I was a salesman. I sold computers.

Subsequently, when I joined the Licensing Department, I was responsible for negotiating licenses for IBM's patents with others and for the patents of others and then supervising a team that did that.

And also I was responsible for developing and institutionalizing IBM's licensing policies and practices, including royalty rates.

Q. On behalf of IBM, did you actually negotiate agreements on their behalf?

A. Yes, many agreements.

Q. And in negotiating these agreements, did you actually sit at the bargaining table?

A. Yes.

Q. How many -- how many agreements do you think you executed on behalf of IBM?

A. Negotiated?

Q. Yes. I'm sorry. Negotiated.

A. I negotiated hundreds of agreements, either directly or supervising people and participating with them, people who reported to me.

Q. Do you still participate today in negotiating agreements?

A. Yes, regularly. I've done several this year and -- yes, I do.

Q. Who are some of your clients today at Fairfield?

A. Well, a client for whom I actually negotiate all of their license agreements is American Express. Other clients include Nokia, Samsung, Texas Instruments, and all the way down to small companies and individual inventors.

Q. On behalf of IBM or Fairfield, have you negotiated agreements with entities in Asia before?

A. Yes. I have Asian clients, such as Samsung,

and also have negotiated on behalf of clients with Asian companies.

Q. Have you, in the past, negotiated agreements concerning disk storage technology?

A. Yes. One of my first licensing responsibilities at IBM in the '70s, and I had full responsibility for negotiating IBM agreements having to do with magnetic disk storage drives and medias, including floppy disks.

Q. Are you a member of any kind of professional organizations or affiliations?

A. Yes. I've been a member of the Licensing Executive Society for over 25 years.

Q. Would you tell the jury what that is, please?

A. It's a worldwide organization made up of technology transfer or licensing professionals, such as myself or IP lawyers, government laboratory employees, university employees, who have technology transfer responsibilities.

Q. Is that group also known by LES?

A. It's called LES, yes.

Q. How many members does LES have?

A. 12,000 members approximately worldwide; 6,000 in North America.

Q. Were you ever an officer in LES?

A. Yes. I was an LES officer and trustee for a 12-year period, and I was President of LES North America 1999 and 2000.

Q. We will get to your opinion in a moment, but what is your ultimate opinion in this case?

A. My ultimate opinion is that the parties would have resolved their differences with a license agreement.

Q. And what were the rates you assigned to that agreement?

A. It was my opinion and is my opinion that there would be two separate rates, one which would apply to optical disk drives, which would be 6 percent of selling price, and the other necessitated because many optical disk drives are shipped embedded in personal computers, would be a royalty rate of 2 percent of the selling price of the personal computer with the embedded optical disk drive.

Q. We will have another damage expert next, but have you reviewed his opinion calculating your royalty rate times the royalty base?

A. Yes. I have seen Mr. Davis' work in that respect.

Q. And what is the ballpark of the damages that result from that calculation, please.

A. It's hard for me to remember precisely, but the aggregate number is -- is somewhere approximately 71 or $72 million.

Q. Let's get back to your respective rates, the 6 percent and 2 percent.

Explain, if you would, how you arrive at those rates.

A. First, I needed to determine or I chose to determine a rate applying to the optical disk drive.

And so as is common in such a situation, I sought comparable rates and found comparable rates in two separate licensing programs involving DVDs where the rates were 3-1/2 in one case and 4 percent in another case.

Then I looked at a very comprehensive royalty survey that was done by the Licensing Executive Society in 1997, and this was a benchmark study, meaning that there never had been any such thing before, which is used to this very day, just like a standard textbook for people who are seeking to set reasonable royalty rates.

THE COURT: Okay. I tell you what, we're going to take our lunch break. We'll take -- be back at 10 minutes after -- 10 minutes after 1:00, 10 minutes after 1:00.

Remember my instruction about not

discussing the matter. You can leave the courtroom.

(Jury out.)

THE COURT: All right. You may step down, Mr. Murtha.

Everyone be seated. Court's in recess. I need to see counsel up here.

COURT SECURITY OFFICER: All rise.

THE COURT: Court's in recess.

(Bench conference.)

THE COURT: I just want you to know, Mr. Luck, the jury can't hear you. They wrote me a note, okay?

MR. LUCK: I'm sorry. Okay. I'll speak up.

THE COURT: You know, there's no value -- I'm not trying to embarrass you, but, you know, if the jury doesn't know what your question is, it's hard for them to understand what the answer means.

MR. LUCK: I understand. Thank you, sir.

THE COURT: All right. I'll see y'all at 10 after.

(Bench conference concluded.)

(Recess.)

*   *   *   *   *

CERTIFICATION

I HEREBY CERTIFY that the foregoing is a true and correct transcript from the stenographic notes of the proceedings in the above-entitled matter to the best of my ability.

/s/________________________ ____________________
SUSAN SIMMONS, CSR Date
Official Court Reporter
State of Texas No.: 267
Expiration Date: 12/31/10

/s/____________________ _________________
JUDITH WERLINGER, CSR Date
Deputy Official Court Reporter
State of Texas No.: 731
Expiration Date: 12/31/10

/s/_____________________ _________________
SHELLY HOLMES Date
Deputy Official Court Reporter
State of Texas No.: 7804
Expiration Date: 12/31/10